Library

MAR 27 1918

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XXXVIII
No. 12

NEW YORK, MARCH 21, 1918

Ten cents a copy
Three dollars a year

A Shortage of Automobiles!

Wise Dealers Are Taking Every Car They Can Get. Those Who Delay Now Will Face A Serious Situation When The Active Selling Season Opens.

Daily developments serve to confirm our earlier prediction that this year will witness an automobile shortage more acute than any the industry has experienced within the last several years.

From the present indications it seems certain that by July 1st all stocks of the most popular cars will have been exhausted, and that from that date on dealers and buyers will have to depend upon limited productions to meet their wants.

Because of war conditions a curtailment was made in the production schedules of every manufacturer in the industry. No maker had planned to produce as many cars this year as were built last year. But now even those greatly-reduced schedules have been so interrupted by one influence or another that it will be impossible to make up what has been lost.

The most serious condition from which there seems to be no escape is that resulting from freight embargoes. Dealers who do not have cars coming to them every day can hardly realize the seriousness of the situation which exists throughout the industry. Embargoes are placed on shipments without notice and for indefinite periods. A dealer may feel that if he gives his factory instructions to ship him cars on some future definite date that his wants will be taken care of. But before the date of shipment, an embargo may make it impossible.

This will inevitably produce a serious situation for those dealers who rely upon their being able to obtain cars from the distributor when and as they may want them. It will prove of particular disadvantage to those dealers who postpone making contract arrangements.

Hudson Dealers are going to need cars. The billions of dollars that are finding their way into circulation are going to look for automobiles.

No Hudson Dealer need have any worry about over-stocking this spring.

HUDSON SUPER SIX

Hudson Motor Car Company
Detroit, Michigan

Editorial Contents, page 3

Advertisers' Index—Next to last page

The New Improved UTILITY Universal Rim Wrench

Is the Most Serviceable Tool for Motor Car Use

Belongs In the Tool Box of Every Motor Car

Price $1.50

Indispensable In the Service of Every Going Garage or Repair Shop

One Tool Fits Every Nut

The UTILITY Universal Rim Wrench is built in only one size—yet it **automatically** fits every nut on every demountable rim. In the tool box of the motorist, in the stock or the shop of the garage or repairman, it is small enough to be always out of the way—except when you need it. Then it is always ready for use—a single tool that fits, holds, and turns any nut.

The new UTILITY Universal Rim Wrench is beautifully finished in nickel and black enamel. It is more compact and lighter, and built with practically unbreakable jaws. It is shortened to go into the tool box without folding, and is absolutely rigid in action—a stronger brace that cannot close up or slip while in use by the operator.

HILL PUMP VALVE COMPANY, Archer Ave. and Canal St., Chicago

Eastern Sales Office: 149 Church St., N. Y. C.
Western Sales Office: 149 Montgomery St., San Francisco, Cal.

Mfgrs. of Famous UTILITY Protected Heaters for all Motor Cars.

Ask your dealer for it now.

DEALERS, order from your jobber. One of these tools used in your own shop will be a money-maker for you. Sells on sight to car owners.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XXXVIII NEW YORK—THURSDAY, MARCH 21, 1918—CHICAGO NO. 12

U. S. A. Motorcycle Engine Completed

Of Two-Cylinder, Vee, Air-Cooled Type and Capable of Developing 15 B. Hp.—Moderate Compression Used to Enable It to Run Smoothly Under Load at Low Speeds

By P. M. Heldt*

WORK has about been completed on the new engine with which are to be fitted all motorcycles to be purchased by the Quartermaster General's Department from a certain date in the not distant future.

Like the three special truck models designed for the department, the motorcycle will bear the name of the U. S. A. and will be used for a wide range of duties at and behind the front. Probably 90 per cent of all the machines required will be fitted with side cars, and in view of this and the heaviness of the roads to be traveled, the engine will be built with slightly lower compression than present-day standard motorcycle engines. This will somewhat depress the power curve at the upper end, but will enable the engine to run on full throttle at a lower speed; in other words, it will cause the machine to "hang on" with great tenacity in pulling through sand and mud or under other difficult conditions.

There is nothing radically new in the design of the engine, which may be said to embody the best modern practice in motorcycle engines. Where deviations from stock practice have been made the reason has been either that the special purpose for which the machine is designed could be better met by a different design, or, since no commercial questions need be considered, and the best is just good enough for Uncle Sam's boys at the front, materials are used which would not be considered in stock practice because the average purchaser would not appreciate their value.

The U. S. A. cycle engine is of the 4-cycle, two cylinder, Vee type, air cooled. It has a bore of 3 5/16 in. and a stroke of $3\frac{1}{2}$ in., giving a piston displacement of 60.34 cu. in. The compression space is such as to hold $6\frac{3}{8}$ ounces of water, and as one ounce of water is equal to 1.728 cu. in., this figures out to 11 cu. in. As the piston displacement of each cylinder is 30.17 cu. in. this gives a compression ratio of

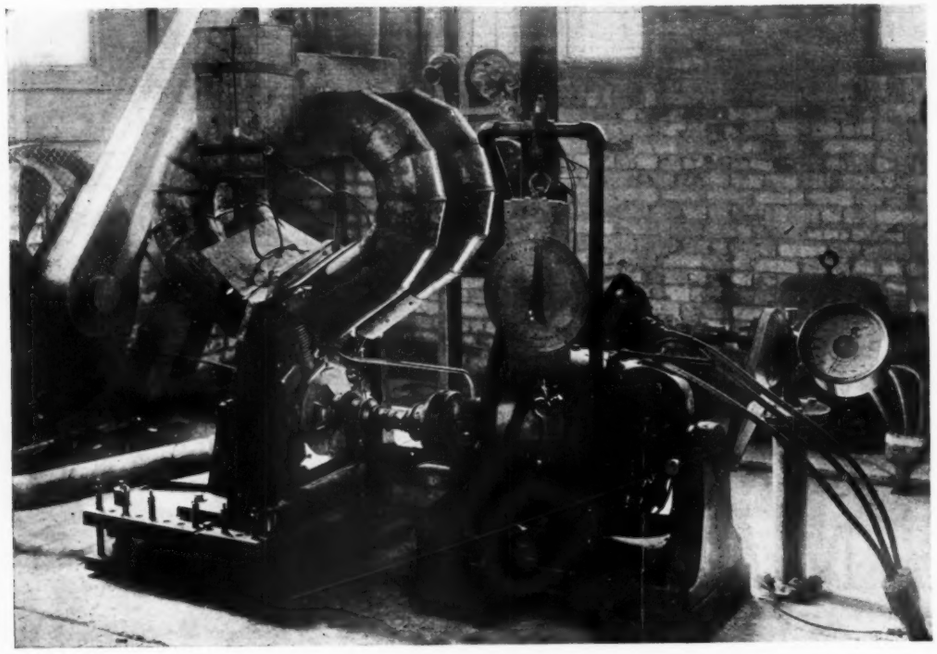
$$\frac{30.17 - 11}{11} = 3.74.$$

The cooling flanges on the cylinders run circumferentially, while those on the head run fore and aft. As the heads are cast integral with the cylinders, longitudinal flanges on the heads facilitate the casting of the cylinders, as compared with a construction in which the cylinder head flanges are arranged radially. The ribs on the sides of the intake valve pocket also run horizontally.

Between the axes of the two cylinders there is an angle of 45 deg., a feature of design that is largely determined by the space available in the conventional motorcycle frame. The two cylinders are secured by four studs each to the aluminum crankcase, which is made in halves, with the division in a plane at right angles to the crank axis.

On the crankcase castings are formed a bracket for the ignition magneto and a saddle for the lighting generator, the two being located on opposite sides. The

*P. M. Heldt went west and spent a week with the Board of Motorcycle Engineers while tests were being conducted to determine the characteristics of the new engine, to select the most suitable of a number of different designs of inlet manifolds, carbureters and air cleaners, and to determine the regulating qualities of a number of electric generators specially designed for this machine.—EDITOR.



U. S. A. cycle engine on testing stand. Note arrangement for artificial air cooling

magneto is clamped down to a planed surface in accordance with standard practice, and the generator is clamped to a cylindrical seat or saddle.

This saddle is bored out and at the middle portion of its length it is relieved to receive a piece of strip steel which is secured in place by means of machine screws and has its end formed into hooks. These hooks engage slots in the clamping strips which are drawn together by a machine screw and nut at the top and thus securely hold the generator in place.

A so-called keystone type of frame is to be used in the U. S. A. motorcycle. Instead of the frame tubing looping around the crankcase at the bottom and carrying brackets to which the engine is secured, the engine crankcase forms the keystone of the frame structure. This places considerable strains on the crankcase in going over rough roads, and to allow for these some rather heavy lugs are cast on the lower part of the crankcase, and the crankcase wall between these lugs is thickened.

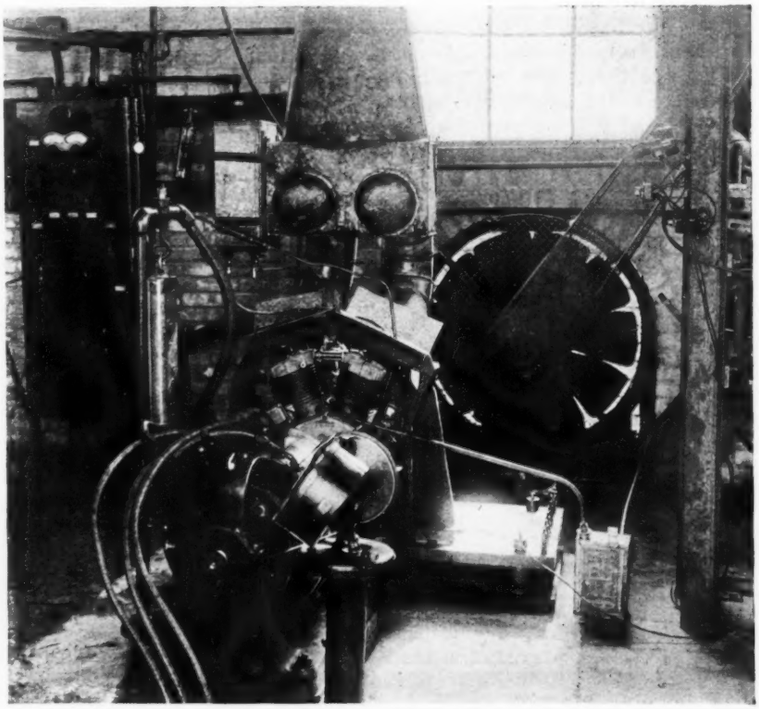
Roller Bearings Used

All bearings on the crankshaft, with the exception of that at the cam-gear end, are roller bearings. One of the connecting rods has its head made in the form of a yoke, and the other is of the ordinary type. Both have solid heads, which is rendered possible by the fact that the crankshaft is built up and the connecting-rod heads can be stripped over the crank-pin before the latter is assembled with the flywheels.

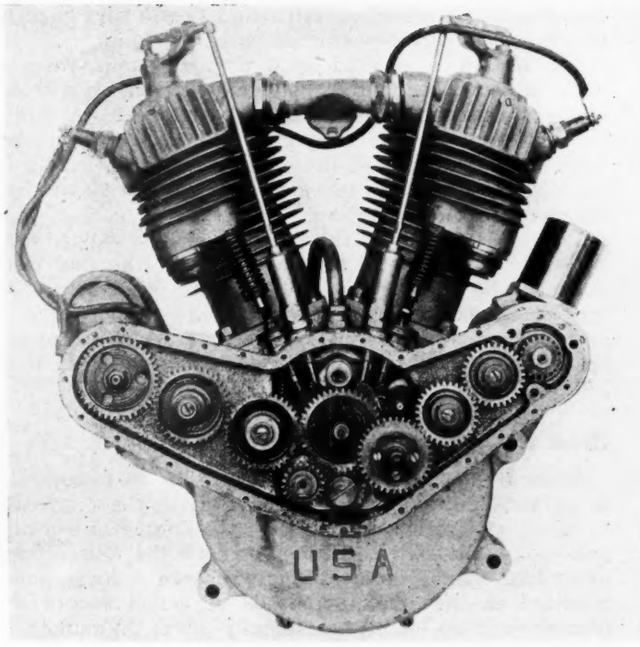
The joints between the journals and the flywheels are of the taper, key and nut type. The two inclosed flywheels will be made from drop forgings instead of from iron castings. Although the bursting of flywheels is an almost unknown occurrence in the motorcycle industry, it was considered good practice to make this impossible in the army machine. On the crankpin there are four rows of rollers, two in each connecting-rod head, and on the main journal at the power take-off end there are two rows of rollers. The piston-pin bushing is bronze.

Cast-iron pistons are used, with three rings at the upper end and an oil groove at the lower end. There is a wide land between the top and intermediate ring which furnishes most of the bearing surface at the top end. A substantial rib connects the piston bosses to the head and helps in the transfer of heat from the head to the skirt. The wrist pin is secured in one of the piston bosses by a 3/16-in. solid pin with a cotter end. The connecting rods are drop forgings of I section, and are made as light as their work will permit.

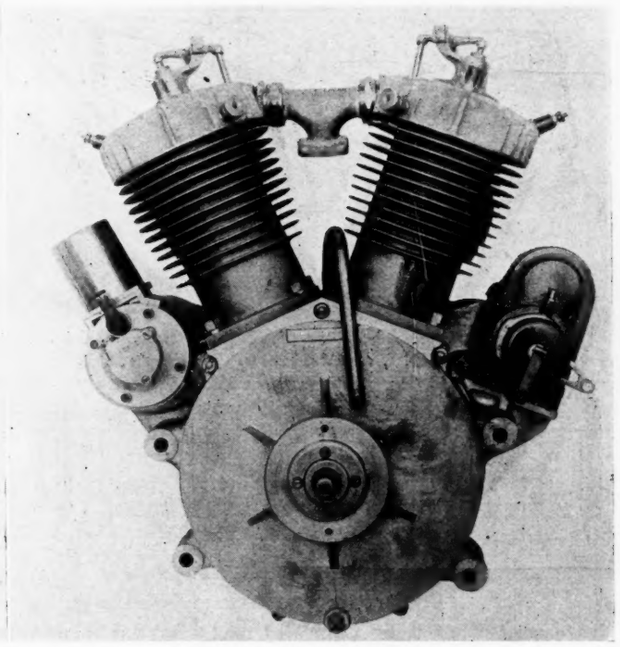
An interesting feature of the engine is the all-spur gear drive for the camshaft, the magneto, and the lighting generator; with it is combined also the worm drive for the oil pump and the drive for the crankcase release valve. There are eleven spur gears in this double train, but each is of liberal dimensions for the amount of power to be transmitted, is carried on a well-supported shaft or a hardened stud supported at both ends, and provision is made for thorough lubrication, so the likelihood of trouble is very slight.



Another view of the testing stand with tachometer in foreground. Note ventilating fan in wall close to floor



U. S. A. cycle engine with gear cover removed, showing generator and magneto drive



Driving side of U. S. A. cycle engine, showing generator and magneto mountings

Though the magneto runs only at one-half crankshaft speed, the generator runs at twice crankshaft speed, this high speed resulting in a very light and compact machine. As current for lighting is used only at night and the generator serves no other purpose than to furnish this current, provision is made for disconnecting the generator during the day.

Magnets and Generator Drive

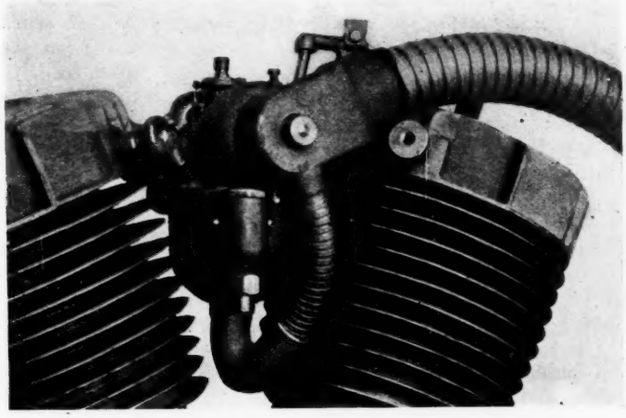
Referring to the photograph of the engine herewith, showing the gear case cover removed, the crankshaft pinion meshes with the camshaft gear directly above it. This latter meshes with a pinion to the right of it, which is hidden in the illustration by the gear in front of it. This set of gears on the same axis can be coupled together and disengaged from each other by means of a jaw clutch whose members are formed on the gears themselves and which is operated by means of a knobbed rod extending through the cover plate.

In designing the jaw clutch the engaging surfaces were given such a rake as to make it impossible for the driver to engage the clutch while the engine is running, though it can be disengaged without stopping the engine. The reason for this construction is that if the generator armature were connected to the crankshaft by a positive clutch while the engine was turning over at high speed, owing to the very considerable inertia of the armature, there would be a tremendous shock and very likely something would have to give way.

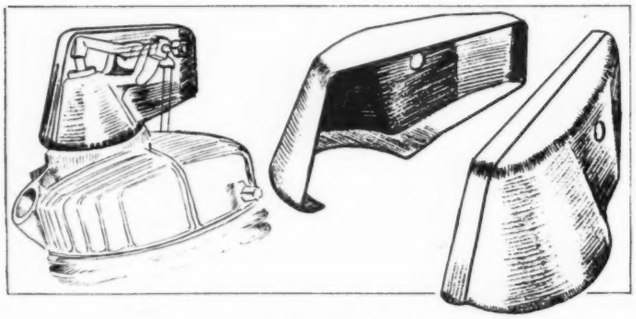
From the clutch gear, motion is transmitted through two idler gears to the generator gear and when the clutch is disengaged these four gears remain stationary. To open the clutch, the driver pulls on the knob of the clutch rod or pin. There are two circular grooves on this rod, into which the nose of a spring-pressed locking dog in the cover plate engages, one groove corresponding to the "in" position and the other to the "out" position of the clutch. All gears are case-hardened and run on hardened studs.

In the photograph showing the gear cover removed from the engine may be seen the method for insuring an accurate mesh of the generator gear with its driving gear. The forward end plate of the generator is turned with a shoulder $1\frac{5}{8}$ in. in diameter and 5/16 in. long, which enters a bore in the gear housing in which it fits snugly. The generator is then drawn up tight against the housing by three $\frac{1}{4}$ in.-28 screws which extend through both the housing and cover plate, so it is not necessary to take off the gear cover plate in order to remove the generator. Provision has also been made to prevent oil from the gear compartment getting into the generator. To this end a knife edge is turned on the hub of the generator gear, which throws off any oil passing along the gear hub toward the generator.

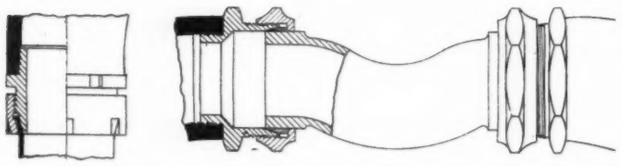
As the two pistons connect to the same crankpin and move up and down in their respective cylinders with little phase difference, as it were, there is considerable pumping action in the crankcase, and to prevent oil being forced out through the vent the latter is opened and closed by a rotary valve at the proper periods in the revolution of the crankshaft. The timing of the valve is such that it is closed whenever the crankcase volume



New carbureter specially designed for the U. S. A. motorcycle



Pressed steel cover for inlet valve



Exhaust and inlet manifold joints

decreases. Thus there is at all times a partial vacuum in the crank chamber and there is no tendency for the oil to be forced out through the bearings and joints. The distance from the center plane of the engine to the front chain center line is 4 5/16 in.

The inlet valves are located in cages over the exhaust valves and are operated by tappet levers and rods from cams on the same camshaft as the exhaust cams. The main springs of the inlet valves are inside the cages, but there are supplementary springs on the tappet rods which cause these rods to maintain contact with the rock levers and the latter with the cams.

All of the valve springs are enclosed, and, in addition, a pressed steel housing in two parts has been worked out for the inlet valve cages and tappet levers. These housings are held in place by the bolts on which the tappet levers are mounted. The housing fits snugly around the bell-shaped inlet valve cage and is clamped under the head and nut of the tappet lever bolt. The bolt is drilled out for wick oiling and has a reservoir with clip cover in its head which comes outside the housing, so the latter does not interfere with lubrication. In fact, the whole inlet valve assembly can be removed without first taking off the cover.

Flared Tube Joints for Manifolds

Instead of the flanged joints for inlet and exhaust manifolds which are universal in automobile and truck practice, flared tube and gland type joints are used for the exhaust and inlet pipes. The exhaust outlet on both cylinders extends downward, as this is the direction the exhaust pipes must take, and hence the number of right-angle turns in the exhaust passage is kept down to a minimum.

Into this outlet is screwed a steel nipple with a hexagon on its outside which serves also as a flange that bears against the casting. The outer end of the nipple is tapered to receive the flared end of the pipe and a nut with a female taper screws over the nipple and securely holds the exhaust pipe in place.

The inlet pipe joint is similar, but the nipple, instead of being tapered on the outside, is tapered on the inside, and a gland ring on the smooth-turned end of the pipe is forced into the nipple by the gland nut screwing over the nipple. This form of joint has one great advantage at this point. The inlet pipe connects to both cylinders and the distance between cylinders will vary slightly, which causes no inconvenience with this joint.

Lubrication is effected by a plunger pump which is built into the gear cover plate and driven by a worm and worm wheel from the magneto drive gear. A rotary valve is used for the oil pump, which is in one piece with the worm gear of the drive, and it can hardly be doubted that this type of valve is more dependable than the more common ball check valve type.

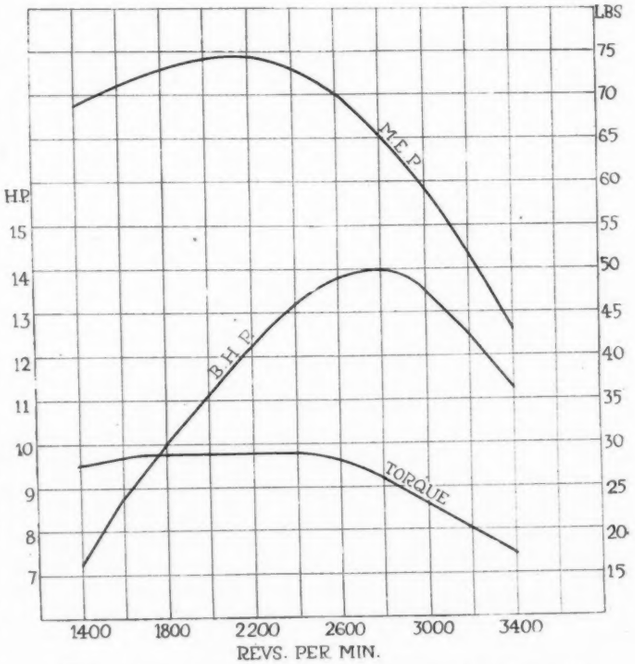
The oil is taken by the pump from the supply tank combined with the fuel tank and fed into the gear compartment on the engine and into the crankcase. As the oil is fed to the crankcase continuously there is always a certain amount in the case which is picked up by the revolving flywheels and distributed over all interior parts.

Hand Pump for Additional Oil

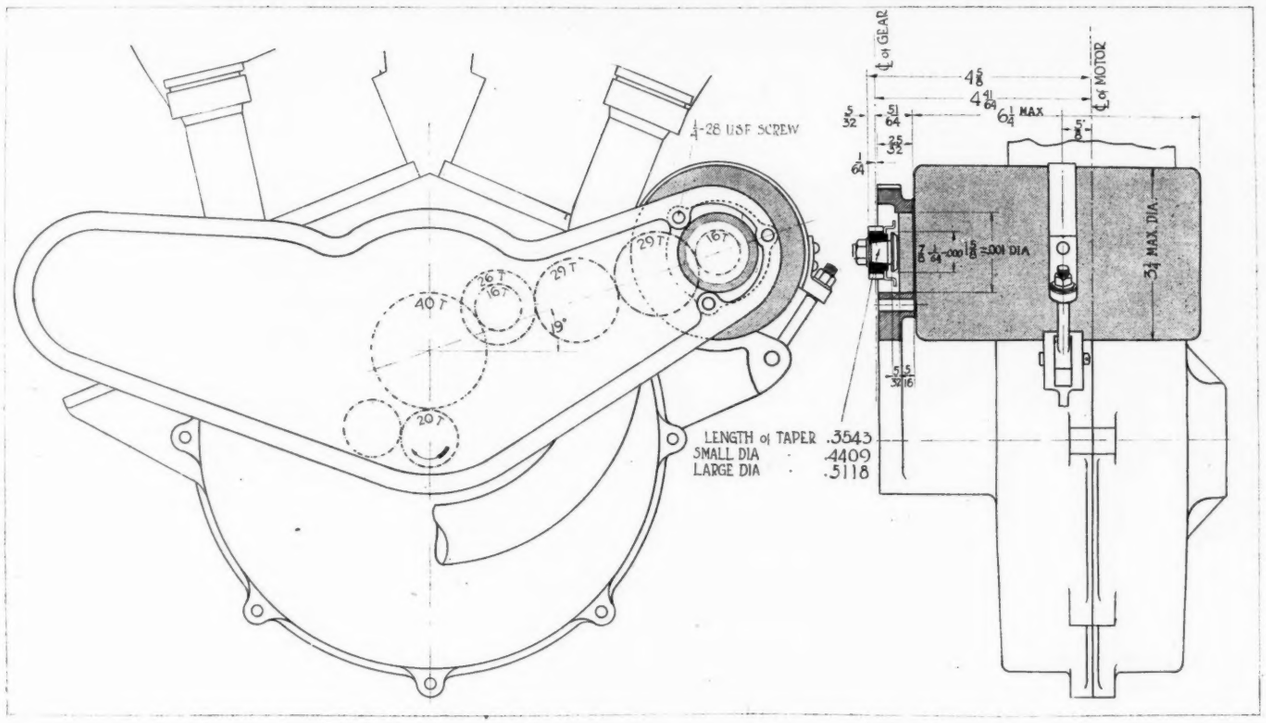
A hand pump is also to be carried on the motorcycle, to permit of delivering additional oil to the crankcase in climbing long grades or when the engine is working under other difficult conditions. In all the illustrations of testing stands herewith may be seen a hand pump mounted on the stand by means of which one of the testers could inject oil occasionally when the supply in the engine seemed to be running low. At the bottom of the crankcase is a shallow oil well into which a drain plug screws from the side of the case.

At the present time practically all motorcycles are fitted with a certain make of carbureter which seems to fit the conditions of motorcycle work particularly well, and the probability is that this carbureter will also be used on the U.S.A. motorcycle. It is of the type in which the needle valve in the spray nozzle is lifted by a cam mechanism actuated by the throttle valve.

It is now planned to use an air cleaner or strainer on the carbureter air inlet so as to keep dust and gritty matter out of the cylinders. This is particularly desirable on a motorcycle because it may happen that a rider on striking a sandy stretch of road may fall, the air inlet coming down to the sand and the motor continuing to



Horsepower torque and m.e.p. curves of engine with equipment finally selected



Drawing showing generator mounting and drive

run may draw in sand which will ruin it in short order. Aside from this eventuality, the roads and tracks over which military motorcycles are compelled to travel, often in squadron formation, are apt to be very dusty in summer time and the fitting of an air cleaner would seem to be an excellent idea, if it does not materially reduce the engine power.

The make of carbureter referred to has had two separate air inlets, but in order that all of the air may be strained by a single cleaner the maker has brought out a special model in which the two air inlets are combined into one. From this inlet connection is to be made to the air cleaner by means of a flexible tube.

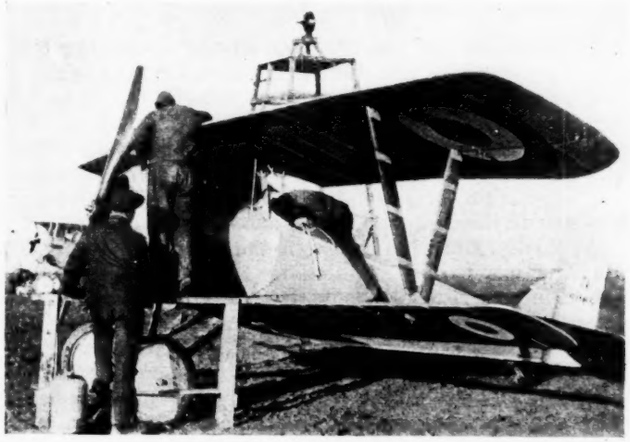
Several changes have been made in the carbureter to add to its efficiency. Thus a low speed adjustment has been provided by making the cam in the form of a bronze spring with screw adjustment. The throttle valve shaft is made of tobin bronze instead of brass and the throttle shaft bearing surface has been increased. The float valve is 35 per cent nickel steel to obviate rusting.

In one series of tests the engine developed a maximum power of 15.3 hp. at 2900 r.p.m. This corresponds to a piston speed of 1750 ft. per m. and a mean brake effective pressure of 65.6 per sq. in. Whether the equipment used during this test will be the regular equipment is still undecided.

Experiments are being conducted with three different designs of inlet manifold, with different carbureters, carbureter air valves and dust separators. It is the intention to use a dust separator if one can be found which does not decrease the power too much. The attachment of an air cleaner to the carbureter alters the suction curve and as the carbureter is of the type in which the gasoline flow is regulated by a needle valve lifted by the throttle through the intermediary of a cam it is likely that the cam outline will have to be changed. In a preliminary test run with one of the air cleaners the setting of the carbureter had to be changed with almost every increase in speed to get the best power results.

The final selection of equipment will be made not entirely on the basis of maximum power developed but also in accordance with the pulling power and smoothness of operation of the engine at low speed, easy starting and other characteristics.

The engine design for the U. S. A. military motorcycle is the work of the Motorcycle Division, Engineering Department, Quartermaster Corps, which occupies offices in the Union Station, Washington, D. C. This was formerly the Military Motorcycle Standardization Board, its members being William S. Harley of Milwaukee, Wis., Oscar Hedstrom of Springfield, Mass., and Frank Schwinn of Chicago, with Capt. F. C. Hecox representing the Army. Since the establishment of offices in Washington, Charles Franklin has been in attendance for Mr. Hedstrom most of the time, as Mr. Hedstrom's business does not admit of continuous absence, and A. W. Herrington has also been taking part in the work, having charge of all tests.



Copyright, Bureau of Public Information

Final inspection before a trip

Organizing

A Factory Liberty Loan Drive

Method of Planning the Campaign to Tap Every Source in the Plant —How to Chart the Territories and Distribute Them

By J. Edward Schipper

HANDLE the Liberty Loan Drive systematically. A wonderful showing can be made if this is done, not only for your company, but, if carried out throughout the industrial plants, for the whole nation.

A simple, direct organization, well balanced, and with its roots tapping every source, will work wonders. Study the method herewith, and adapt it to your factory. You will be gratified with your success, and the company behind you will feel a thrill of pride in a truly patriotic and intensely useful accomplishment.

The loan drive starts Saturday, April 6, and will continue for three weeks. By April 1 your organization should be complete, with toes to the mark, ready to start with a dash at the flash of the gun, never to let up until Saturday, April 27, when the drive will be over.

Herewith are charts showing how to divide your company into territories. If your company has an organization chart, this is already done for you. If it has not a chart, the sample charts herewith will show you how to make one up. The organization must be first charted before you attempt to map out your company for the drive.

After the chart of the organization is in mind the chart for the Liberty Loan Drive can readily be made up from it, as illustrated herewith by the Packard example, where the chart of the organization is given, and a parallel chart for a typical suggested loan sales organization is shown with it. There must be a supreme head to the organization, and the best results are obtained if one man is picked for the job and given full responsibility.

Let President Select Manager

The president of the company should choose the best sales executive he can find in his company and make a patriotic donation of the greater part of his time for the three weeks during which the drive will last. He is put in charge of all matters pertaining to the drive, and has for his direct assistants an advertising manager and a treasurer, or accountant, who act as his advisers in addition to handling the duties hereafter described.

Authority must be vested in the Liberty Loan Sales Manager to pick his entire staff. He divides the organization into territories, which are really departments and sub-departments of the company. As he must make his sales campaign intensive in the highest degree, he must make his territories relatively small. Every one in the factory and office force is regarded as a prospect, and naturally every one must be reached and solicited.

In a big organization a number of sub-sales managers should be appointed. These would correspond to the branch managers in a sales organization which spread over the country. These men in turn divide the territories over which they have control into smaller territories, and appoint the sales managers for these. If these sales managers want assistants they must have the power to appoint them.

Do Not Rely on Volunteers

Like organizing an army quickly, it is imperative not to wait for volunteers. The volunteer system has been found to be useless. Volunteers will not make our drive on Berlin, and volunteers cannot be relied upon to make our drive at home. The president of the company, and its board of directors, must stand squarely behind this issue, and should make it a part of the business of the organization. Direct appointments selected in accordance with the fitness of the men for the work should be the method employed.

It is needless to point out here what interest industry in general has in the succcess of this new drive. The eyes of the world are on us; Teutonic eyes as well as those of the allied and neutral nations. Not to more than succeed would be giving the most effective kind of comfort to the enemy. The war has poured millions into the coffers of certain forms of industry, and naturally out of these same coffers must be loaned, not given, the millions necessary to successfully force the issue.

In a small factory it will not be necessary to divide the territorial underbranch managers. In a large organization it is better to do so in order to keep the entire work in hand and to make the campaign more intensive. As soon as the Bond Sales Manager has been appointed he should provide himself with a complete chart of the organization, in accordance with the plan shown in the charts herewith. He should make a study of this chart and then divide it into logical branches. It is good practice to make the branches and territories correspond to departments of the business rather than to attempt to divide the factory into geographical territories, such as floors and sections of floors. The reason for this is that the men and women in the same departments know each other better, and the sales are thus facilitated.

Chart the Territory

After the territory has been mapped out by the organization chart the number of sub-salesmen should be determined. In a fairly large concern, the branch manager selected should appoint a man in each of the sub-departments. For instance, in an automobile factory there may be a branch sales manager in charge of the manufacturing territory. This would include everything which would be classified on the organization chart under the head manufacturing, and would embrace, as

Typical Organization Chart for a Liberty Loan Campaign

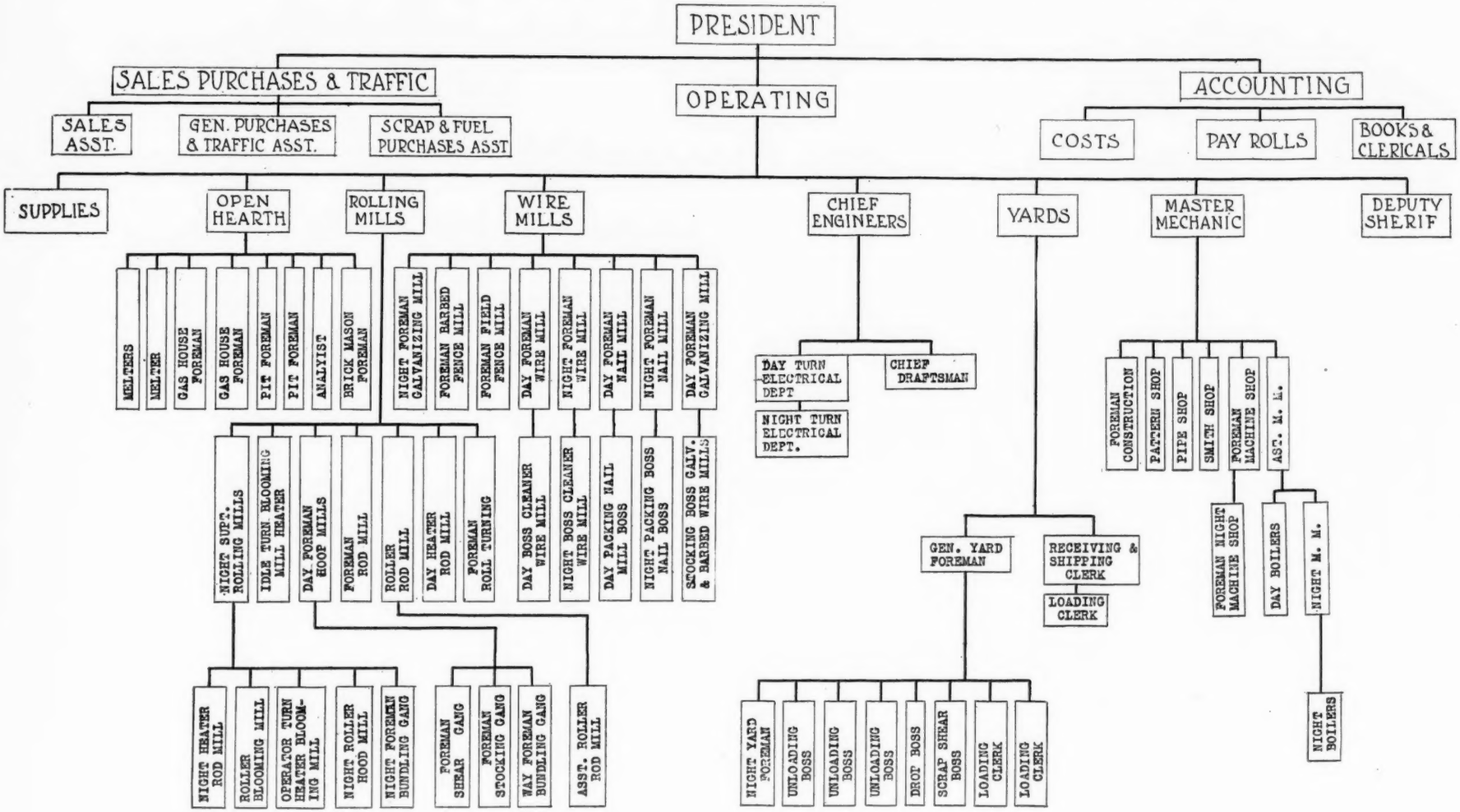


Fig. 1—A chart of the complete industrial organization of the factory should be the foundation upon which to build up an effective Liberty Loan Drive plan. This is a typical chart of the kind. With such a chart as a basis, the various territories in which the several committees and sub-committees are to operate can be visualized and clearly mapped out beforehand

in the instance of the Packard, which is taken as typical, the following divisions:

MANUFACTURING TERRITORY

Carriage	Forge and foundry	Purchasing
Chassis	Service	Traffic
Body	Mechanical	Labor
Truck	Construction and maintenance	Welfare
	Material and laboratory	
	Production	

These departments are handled by a sub-branch manager, or a sub-dealer. If the number of men under any particular sub-dealer is large, he in turn should have salesmen. The sale must be made in the highest degree intensive. Every man in the organization, from the president down to the laborer, should be seen, not once, but many times, during the campaign, so that when the final day comes as near 100 per cent as possible should be obtained.

The sales campaign is handled directly, as far as policy is concerned, by the Bond Sales Manager. His authority should be absolute. More than that, he should have the backing and the indorsement of his company. Under his direct command he should have a competent advertising manager. The advertising manager of the firm will generally be the best man on this job, or a good live, enthusiastic young fellow from the copy department will oftentimes be glad of the opportunity to distinguish himself on this work.

The house organ, if there is one, should get out a daily newspaper, circulated to every man in the company, telling of the progress of the campaign, listing the names of those who have bought, those who have taken 100 per cent or more of quota, and generally keeping every employee informed and enthusiastic. The advertising manager should get this out, and he should in turn have a staff of reporters to help him. His reporters may oftentimes be salesmen, but it is just as well to have men who are not bond salesmen doing this work. It will have more people working.

Have Everybody Take an Active Interest

Do not be afraid to have the people in the factory working on this. The more that are working the bigger the results. Do not worry about the decrease in business because of the distraction of attention. In the first place, the cause is perfectly worth shutting down the plant, were that necessary; but when enthusiasm is worked up work will proceed faster. In fact, the results are more apt to be a gain in productive activity rather than a loss. Enthusiasm as regards a project only comes from working on it. It is impossible to have a man enthusiastic on the Liberty Loan question if he sits back in his chair while others about him do the work. Get as many men and women as possible in the plant to help.

It will be the duty of the advertising manager to advertise the drive. He will also be editor of the daily edition of the house organ; or, if there is no house organ, the daily bulletin news sheet which should be published. He will also print posters and put them around the plant. It is best to change these every day, if possible. If the sales manager puts on a contest, as he should, between the various branches or territories, the advertising manager should put his shoulder to the wheel and urge on the contestants by reporting in the daily edition of his newspapers the standings of the teams and the methods used by each to succeed.

The branch or department sales managers have direct charge of all sales in their respective departments. In consultation with the sales managers they arrange the quotas for their territories and appoint the sub-dealers or salesmen under them. As stated, where the territo-

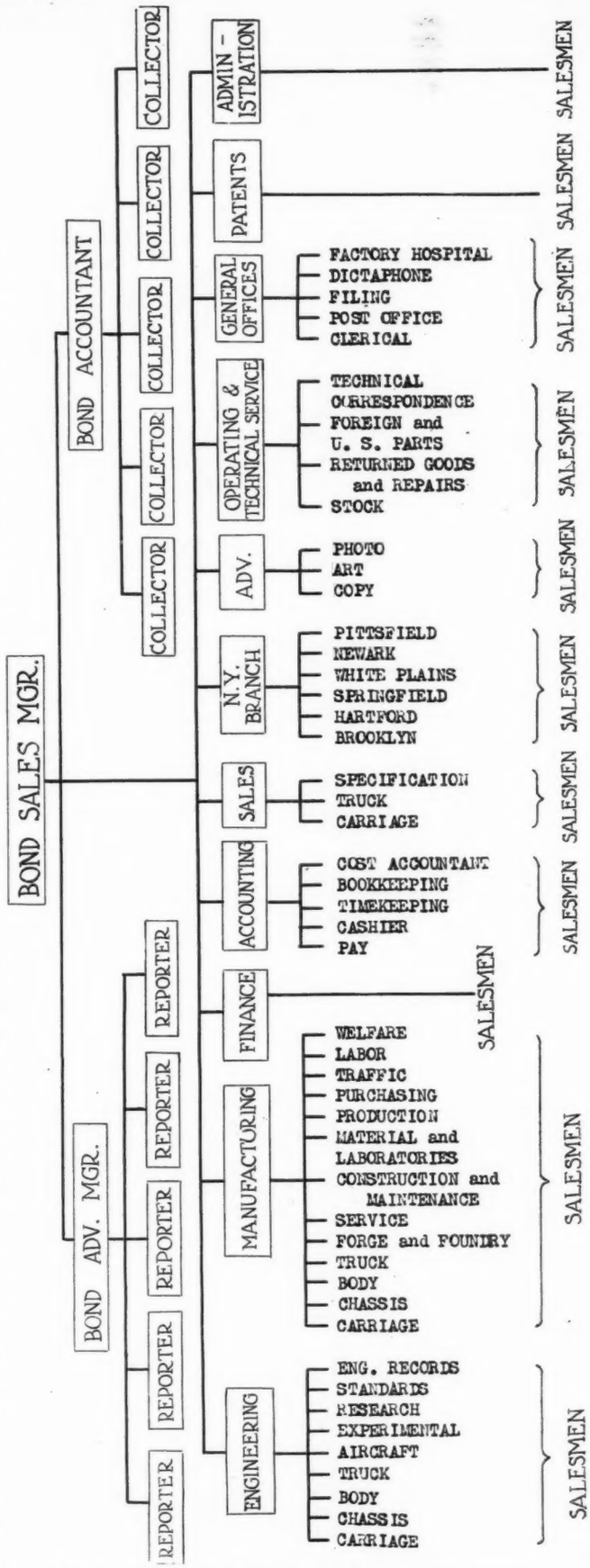


Fig. 3—Suggested chart for a Liberty Loan organization derived from the chart given in Fig. 2

ries under the branch managers are large, such as they will be in the factory departments where large numbers of men are employed, it is always best to divide into sub-branches so that the sale will be on a more intensive scale.

The third branch under the sales bond manager has to do with the finance.

DO NOT ATTEMPT TO MIX THE ACCOUNTS WITH THE PAYROLL. IT WILL LEAD TO TROUBLE.

Even in a small organization endless confusion will result if you attempt to take the money for the Liberty Bonds out of the pay envelope. There is a better way.

The sales manager should appoint a bond accountant. He should be a man who is selected from the financial department. He must handle all the money that has to do with the bonds. This must be divorced entirely from the payroll or other books of the company. If a bond is sold for cash, the transaction is simple. The money is taken in, and the bond, or an advance substitute or receipt, handed out. When the bond is sold on the installment plan, as it usually is, it requires a set of books. These are simple by themselves, but when mixed with payroll accounts and time clerks' reports they are the reverse.

All bond transactions should be numbered. The installment book should have first the number, then the buyer's name, then the amount paid on deposit, and after that weekly blanks to be filled in with the installments paid. A deposit of 10 per cent cash should be required, and the balance at the rate of at least 10 per cent a month. As soon as an order is turned in to the accountant he enters it in his book, assigning the number and crediting the deposit, which must always accompany the order. Certain hours, certain days of the week, should be appointed for paying the installments. In the shop, where the men file past the pay window, it is a very good idea to have another window a short distance away, where the men file past in accordance with the numbers on their Liberty Bond orders. In this case, the bond accountant may need assistants from the pay department.

Summary of Organization

To summarize the organization:

1—There is first a supreme head. He may be entitled bond sales manager, or director of the Liberty Campaign.

2—Under him there are two direct assistants, an advertising manager and an accountant, and as many branch managers as the size and scope of the company necessitate.

3—The advertising manager is editor of the daily newspaper, which may be a special daily edition of the house organ or a regular daily newspaper sheet.

4—The accountant takes care of the books, recording the buyers and the deposits made by them, and also keeps an account of the weekly installments paid by each.

4a—He has as his assistants men who are drawn from the pay department. These he uses to collect money in different parts of the shop. He may set up pay booths or he may use the regular pay booth immediately after the the regular pay has been completed.

5—The branch managers are distributed to take care of the main divisions or departments of the organization. They are the main links in the chain. It is up to them to see that the quotas of the respective territories are sold, and it is up to them to arrange with the bond sales manager the quota of their departments. Under them they appoint sub-branch managers where necessary.

5a—Under the branch managers and the sub-branch managers the salesmen operate.

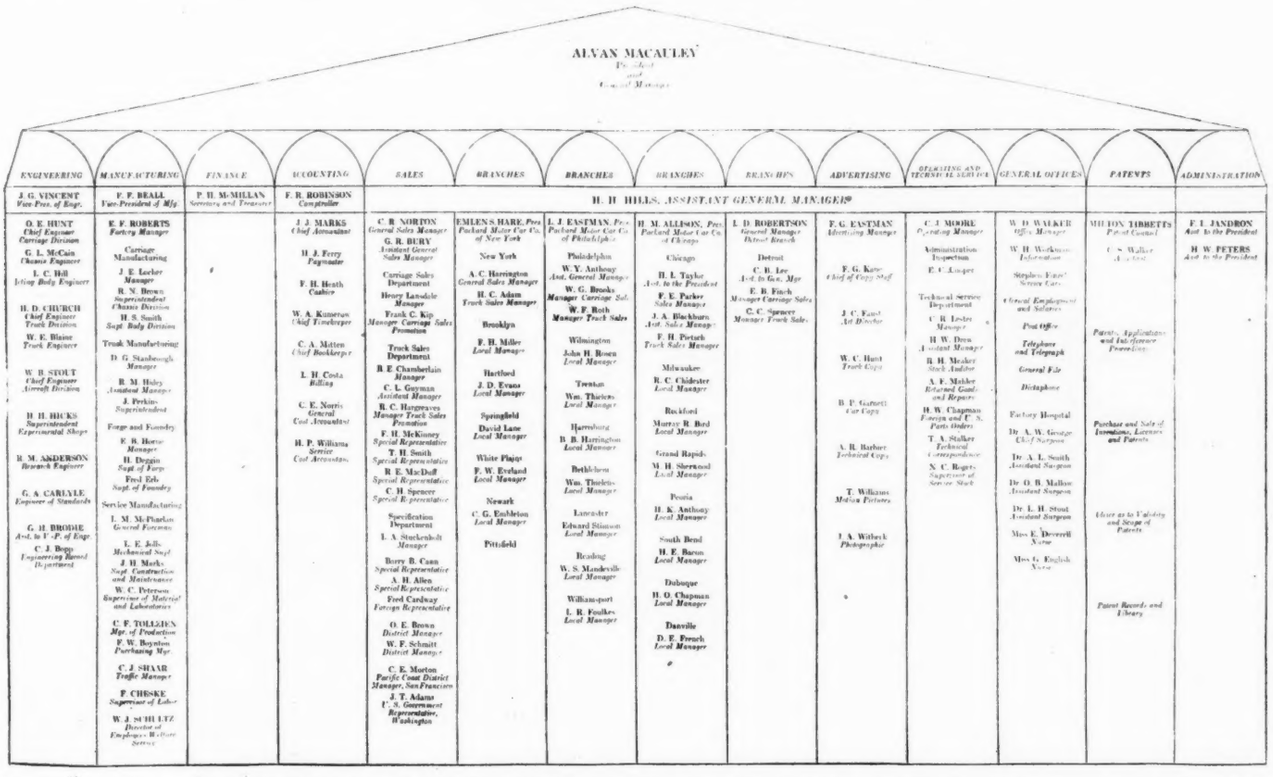


Fig. 2—Organization chart of the Packard Motor Car Co., from which the chart in Fig. 3 was taken, showing how the organization chart can be used for planning the Liberty Loan Drive and dividing the organization into territories

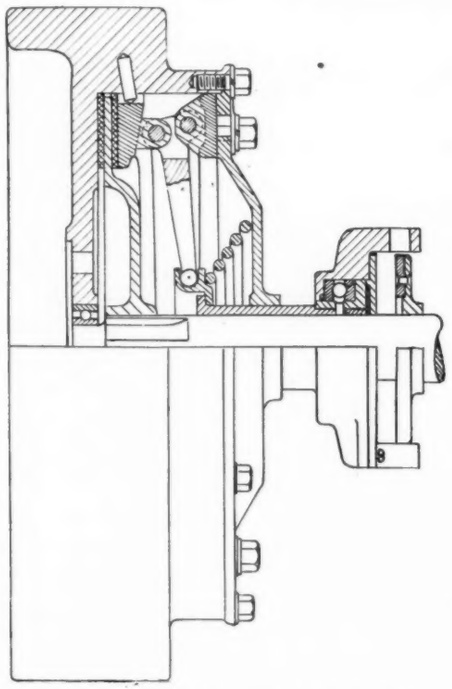
Borg & Beck Eliminates Clutch Brake

Thrust Bearing Prevents Spinning of Clutch Shaft, Thereby Obviating the Necessity for Friction Device

FEW developments have taken place in the clutch field during the past year, largely because this is one of the parts which give the least amount of trouble. Changes in clutch design were quite rapid during the first few years of the past decade, owing to the fact that the torque characteristics of automobile engines presented a variety of new problems to clutch manufacturers. The increasing rotative speed of automobile engines caused a revision of the earlier methods, with the result that changes were necessitated from year to year, until about 1915, when clutch design seemed to have attained a settled state.

Occasionally, however, minor alterations are made, and those observed during the past year indicate two tendencies, namely, the gradual abandonment of the clutch brake and a decline in the number of clutches with means for adjustment. A good example of these tendencies is found in the new Borg & Beck clutch, in which the clutch brake has been eliminated, thus giving a design which has made very substantial progress over the type used previously.

The Borg & Beck clutch is well known from its wide use among manufacturers of assembled cars. The accompanying sectional view shows the construction of this clutch and illustrates the method employed to render practical the elimination of the clutch brake. The principal change made to this end is the addition of a thrust bearing at the inner end of the clutch sleeve, so that there is no friction between the sleeve and the transmission shaft when the clutch is released. When there is no bearing at the inner end of the sleeve, the sleeve rotates around the shaft continually, being driven by the spring pressure. This clutch is mounted in the customary manner in a casing which contains both the flywheel and clutch member, or it can be fitted as a self-contained design in which the clutch itself is in a separate casing which is provided with a mounting flange, through which it is bolted against the flywheel web.



Borg & Beck clutch with clutch brake

Referring to the sectional view, the action of the clutch is clear if it is kept in mind that among the rotatable parts only the driven group, comprising the disk A and the shaft B, can stand still when the flywheel is running. All the other rotatable parts are anchored to the flywheel, and these must revolve and drive with the latter. The clutch brake was formerly mounted at the inner end of the clutch shaft and has been replaced by the thrust bearing shown at C. When the clutch is disengaged there is no friction between shaft B and the throw-out sleeve D, the thrust bearing taking the rotating drag of the clutch shaft, thereby eliminating the necessity for a brake to check the spinning action.

Action of Clutch

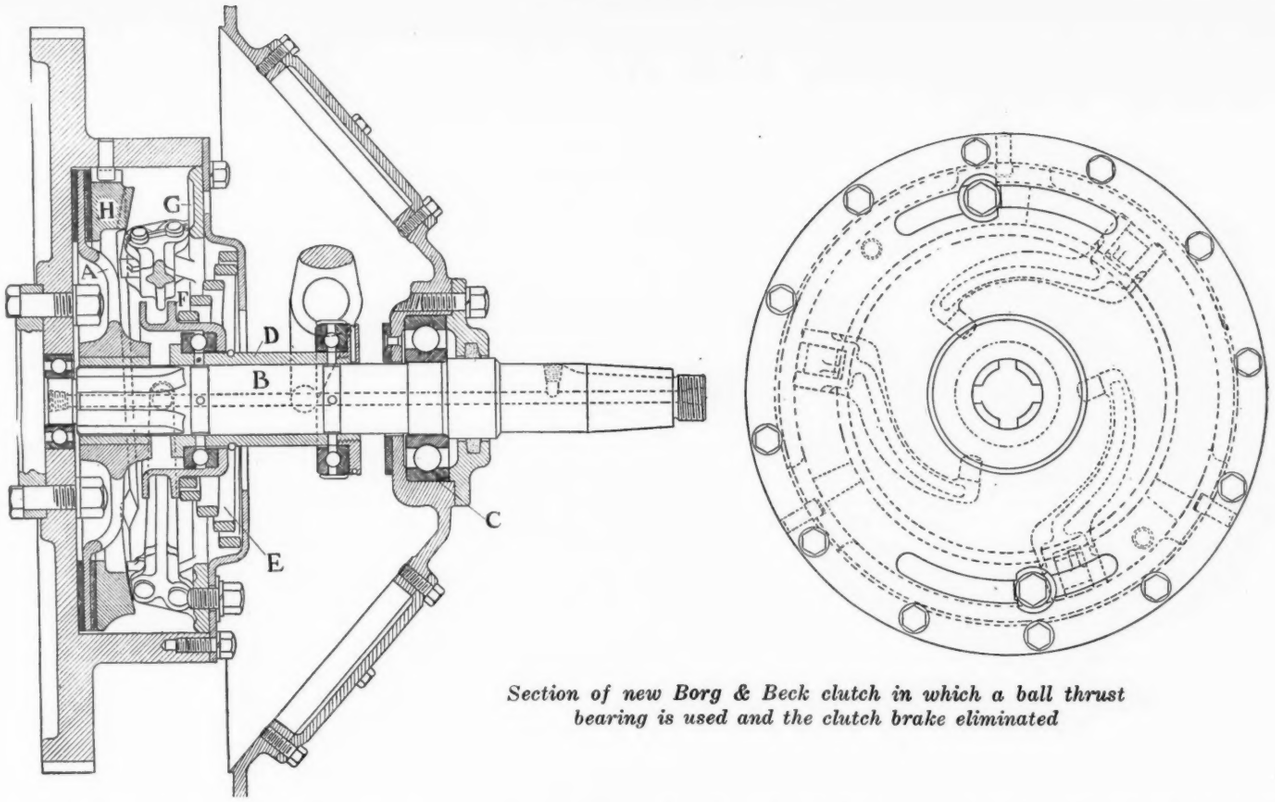
When the clutch is thrown in, all the rotating parts are friction-locked into a single combination and revolve as one with the flywheel. The power of the release thrust spring E, acting through the throw-out collar F, and the bell crank pivot G, drives the thrust shoes outwardly with a lever-wedge-toggle combination against the overhanging, inward-beveled face of the thrust ring H. The thrust shoes in making the friction thrust cannot recede as they climb the face of the thrust ring H, since the parts on which they are mounted are backed against the cover wall or rigid end of the clutch casing.

It therefore follows that the full, part-shafting effect of the thrust is communicated to the thrust ring H, and the latter, in being thus driven hard toward the flywheel, sets up between itself and the inner casing wall a friction grip sufficiently powerful to stop the slippage of the asbestos rings upon the polished faces of the disk, thus giving the drive to the car.

When the pedal is applied for releasing the clutch the retracting parts telescope the coil spring E until it occupies nearly a single plane. The withdrawing parts also release the clutch shoes a sufficient distance from the face of the thrust ring H to permit the latter, together with its companion friction ring, to back away from the disk, thus breaking the friction grip and permitting the parts to come to a stop, while the flywheel and the parts of the clutch anchored to it are left free to revolve idly. The release disk A is so light that it continues to spin only a very short time and does not cause any clashing action in the gears. The full thrust of the spring transmitted through the powerful lever-toggle action to the friction-grip parts is always and easily sufficient to lock the driving, flywheel parts and the driven disk into a fixed, non-slipping relation, for a full driving action; but it is still always within the control of the driver, through the foot-lever, to let the clutch into engagement by degrees; and thus, by a gradual increase of the friction-grip, gradually overcoming the starting slippage, to start the car so gradually as to eliminate everything in the nature of a starting jerk. At the same time that, by reason of the slippage grip, the clutch can be thrown in fast enough to bring the car from a standstill up to city speed within from 25 to 35 feet.

The starting-slippage necessary to obtain a gradual friction-grip calls for an incombustible, non-wearing friction material, and this is provided in the asbestos-friction facings developed in recent years.

Taking-up adjustment is made possible by means of bolts passing through adjustment slots in the cover. When the bolts are loosened and shifted in their cover slots, they control and shift with them an adjustment ring which brings



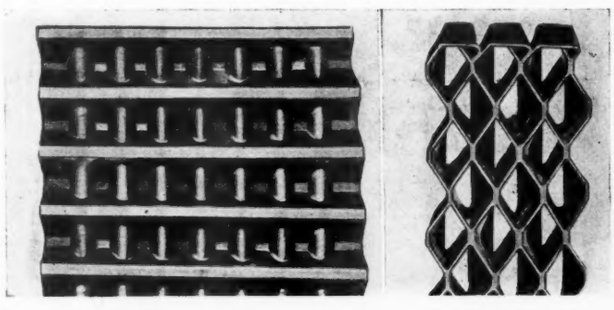
Section of new Borg & Beck clutch in which a ball thrust bearing is used and the clutch brake eliminated

all the shoes to new seats against the non-shifting thrust ring; and these seats being further up the inclines of the tapered ring, the ring is necessarily thrust so much further toward the other friction parts, thus compensating for wear.

The throw-out adjustment can be controlled by taking up on the friction grip adjustment, these two adjustments being taken care of by the same mechanical means. The clutch is held entirely out by means of the pedal, and the parts are then free to be shifted in either direction. To take up for wear, the adjustment bolts are loosened and tapped in a clock-wise direction, ¼ or ½ in., or any distance required, and then tightened again. These clutches are made up to fit standard bell housings or individual mountings.

Spery Radiator Is New Type

A NEW type of radiator, claimed to combine some of the advantages of the honeycomb and tubular types, is manufactured by the Hooven Radiator Co. of Chicago and is known as the Spery radiator. In outside appearance it is very much like the honeycomb type which seems to be preferred for passenger car use. A look at the cross-section, however, shows that the construction is entirely different. The elements of the radiator are zig-zag stampings of sheet metal, into which are stamped depressions which when the stampings are assembled together form vertical tubes. The water circulates not only through these vertical tubular passages but also through the fine passages adjacent to the tube formations.



Tubes pressed in *Front view*

Owing to the large tubular passages in the radiator, it is practically impossible for the latter to become clogged. While the Spery radiator possesses some of the advantages of the tubular type, it is free from its liability to injury by freezing, as the narrow passage between adjacent zig-zag walls will expand readily and thus prevent injury. Repairs to the radiator are said to be easily effected, and its construction is such that it will withstand the shocks and jolts due to traveling over rough ground on solid rubber tires. Its immunity from injury by freezing is said to make the radiator particularly adapted for use on airplanes. Great rigidity is claimed to result from the zig-zag construction. The soldered surfaces at the front and back are particularly wide, which makes the danger of leakage comparatively remote. The Spery radiator is said to have from 35 to 40 per cent more water capacity than either the honeycomb or tubular type, but the basis of comparison is not stated.

Quantities of Material Handled by Ford

SOME idea of the size of the Ford scrap pile may be formed from the fact that the tailings or steel trimmings that come from the lathes and other machines average 100 tons daily; cast iron borings, 25 tons, and sheet steel clippings, 50 tons. The total sales of scrap material from the Ford factory last year approximated $3,000,000 in value. This is in addition to an enormous amount of cast iron borings and baled sheet steel clippings consumed in the foundries of the Ford company. Figures indicate that for every Ford car manufactured waste material valued at about $4 is produced.

To manufacture the scheduled 90,000 cars, it would require over 400,000 tons of steel; over 126,000,000 sq. ft. of material for tops; 3,600,000 wheels and tires each; 4,500,000 lamps; 15,884,414 ft. of vanadium steel shafting and axles; 4,938,000 sq. ft. of glass for windshields; 109,484,404 ft. of copper tubing for radiators; 12,900,000 lb. of steel for magnetos, 30,838 miles of wire for magnetos; 7,836,593 sq. ft. of galvanized metal for gas tanks; 69,959,951 sq. ft. of sheet metal for fenders and guards; 27,940,382 ft. of tubular radius rods.

Details of the Minerva Engine

A New Design Intended for Heavy Duty Only—Large Handholes in Cast Iron Crankcase, Magneto Ignition and Combined Force Feed and Spray Lubrication

IN its general design the Minerva engine follows lines of standard practice for unusually hard service. No radical innovations have been attempted; the requirements of tractor and truck service have in all cases determined the construction employed, and the Minerva is recommended by its makers only as a tractor and truck engine and for certain classes of marine work.

The cylinder bore is 4 in. and piston stroke 5½ in., giving 276 cu. in. displacement. L-head type cylinders are employed, with detachable heads. The cylinders are cast in pairs and have the waterjacket extend all round and down their entire length. The crankcase is a gray iron casting and is parted in a plane below the crankshaft axis. This permits of inspection holes in such positions as to allow direct and easy inspection of the main and connecting-rod bearings. All main bearings are carried by the upper section of the crankcase and the bearing supports are ribbed to the sides of the case, the ribs extending below the center line. Owing to the fact that pads for supports are machined both in front and rear, the engine can be easily mounted in almost any tractor or truck frame. The lower section of the crankcase serves as an oil reservoir and also contains the oil strainer.

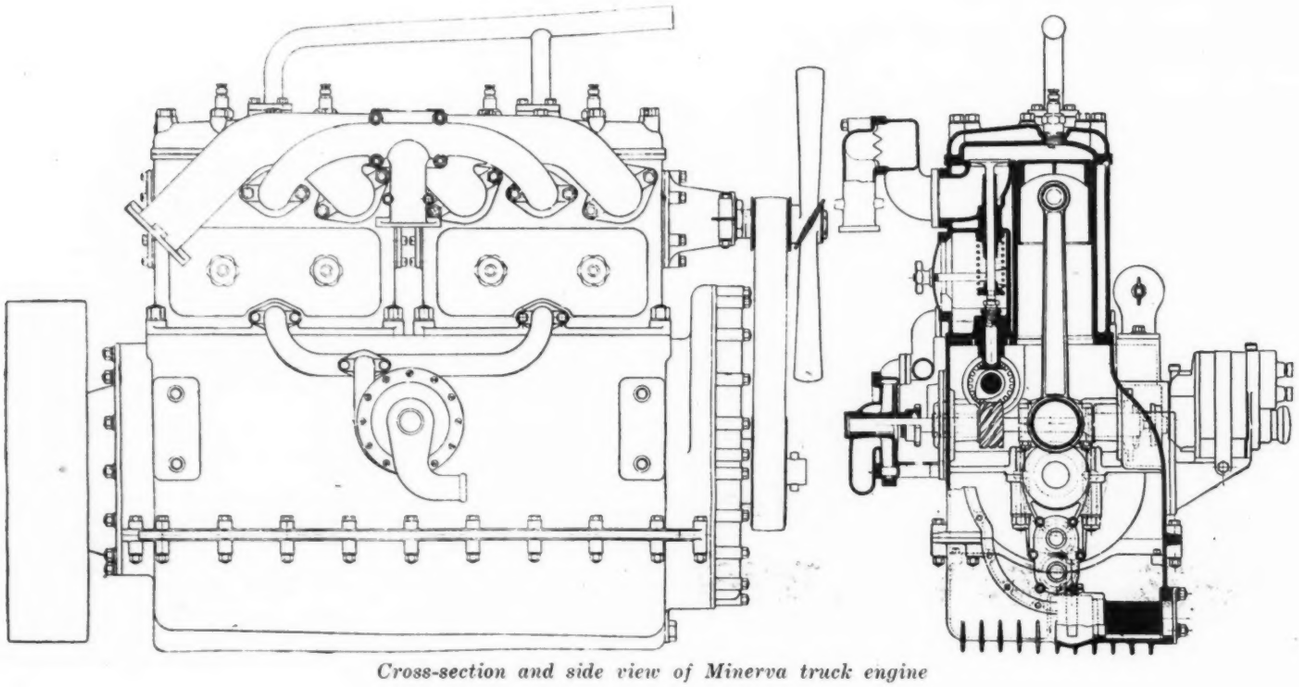
A three-bearing crankshaft is used; it is mounted in ample bronze-babbitt bushings and so constructed that the center bearing takes the entire thrust and allows for expansion or contraction of the shaft. At the rear end a large integral flange is provided, to which the flywheel is secured. This flange also prevents oil leakage at the rear end. I-beam section connecting-rods are used and the caps are fitted with four bolts. Adjustment is accomplished by means of laminated shims inserted between rod and cap, these shims being used also under the main bearing caps. At the wrist pin end the rod has a bronze bushing.

Gray iron pistons are fitted, each having three expansion rings. The pistons are also substantially ribbed. Large diameter valves insure high volumetric efficiency. The valves have a 45 deg. seat and are actuated by the camshaft through mushroom-type cam followers. Separate valve guide bushings are used, and provision is made for adjustments through cover plates on the cylinder blocks. The cams are integral with the shaft, which is mounted in four bearings and driven by spur gearing. Water pump and magneto drive is by means of a shaft placed at right angles to the camshaft, which brings the pump and magneto on the center line between the pairs of cylinders, the pump being on the right and the magneto on the left side of the engine. The driving gears are of the helical type, the driving pinion being of steel and integral with the camshaft, while the driven gear is of bronze and mounted on the cross shaft. Both ends of the cross shaft are carried in large-diameter plain bearings, and a ball thrust bearing takes the thrust of the driving gear. This construction makes it possible to remove the water pump without disturbing the magneto, and vice versa.

The water pump is of the centrifugal type, fitted with self-lubricated bearings and driven through flexible coupling from the cross shaft. Cool water enters the cylinders directly under the exhaust valves. The stuffing box on the pump is easily accessible and can be repacked without disturbing the pump. A high-tension magneto serves for ignition, and all high-tension wiring is incased in tubing.

Lubrication is in the main of the straight force-feed, high-pressure type. A gear type oil pump is cast integral with the front bearing cap and is driven by a spur gear which meshes with a gear on the crankshaft, the pump speed being slightly higher than engine speed. Oil enters the crankshaft through the front bearing and is distributed to the crankshaft, connecting-rod and wrist pin bearings. Oil is taken from the sump through a screen which can be easily removed for cleaning. Provision is also made for draining both sump and suction chamber separately. Other parts of the engine, such as connecting-rod bearings, valve guides, etc.,

(*Continued on page* 588)



Cross-section and side view of Minerva truck engine

Tractor Gear Teeth and Materials

Heavy Service Demanded of Tractor Transmission Calls for a Liberal Factor of Safety—Materials Available for Gears and Their Properties—Different Tooth Forms Used

By A. W. Scarratt

THAT a farm tractor transmission does as much work in 1 year as an automobile transmission would have to do in 200 years was the startling statement made in a paper read before the Minneapolis S. A. E. section at its March meeting by A. W. Scarratt of the Minneapolis Steel & Machinery Co. The author's object was to draw attention to the severe service to which the gears of a tractor transmission are put and to explain the reason for making them strong and heavy. Says Mr. Scarratt:

IT is true that tractor transmissions have been heavy and crude, and that as a result the weight of the machines was high and the efficiency low, but it must be borne in mind that the large gas tractor of to-day is an outgrowth or revision of the steam threshing and road engine of twenty years ago, plus improvements, and not an offspring of the automobile. However, one cannot help but realize the advantages of refined engineering and quality of materials and construction, and of standardization, as exemplified in the modern automobile, and it is for these reasons that there is such a revolution in tractor design.

From the foregoing remarks it will be seen then that when laying out the gearing, careful judgment and good engineering are very essential, if high efficiency, minimum weight, and satisfactory service are to be obtained. Speed, torque, and space limitations, manufacturing facilities, and selling price will all have their influence on the type of gears and the material used in them. Of material the engineer has a considerable choice, and he also has several types of gear teeth to choose from. Materials for gears range all the way from paper, wood, cloth, hide and compositions to the finest alloy steels. Each has some advantage, be it strength, cost, operation, ease of production or wearing quality, and each tooth shape has some point in its favor.

Common Materials Suitable

Table A shows several of the common materials suitable for tractor gears, with the tensile strength, yield point, machining properties and characteristics of each. It will be seen that the variation in strength is great, but actually it is greater in practice than even these figures show, because of the necessity, when using the metals of low strength, to employ a larger factor of safety than is required when using the metals of greater strength, because of the variance in physical properties to be found in the lower grade materials. The physical properties of any of the carbon steels and alloy steels can be varied considerably to suit the designer's requirements, so that the figures given do not apply to all cases. The strength desired is regulated in the heat treatment by the drawing temperature used, the low drawing temperatures giving steels of high tensile strengths, high elastic limits and good hardness, but at a sacrifice of some of the toughness. The higher drawing temperatures decrease the tensile strength, elastic limit and hardness, but will materially increase the toughness. Therefore, in choosing the material for a gear, careful consideration must be given to see that it has the proper strength for the loads imposed upon it, proper hardness to insure reasonable service and proper dynamic properties to resist impact and fatigue. Here is where we lack much information.

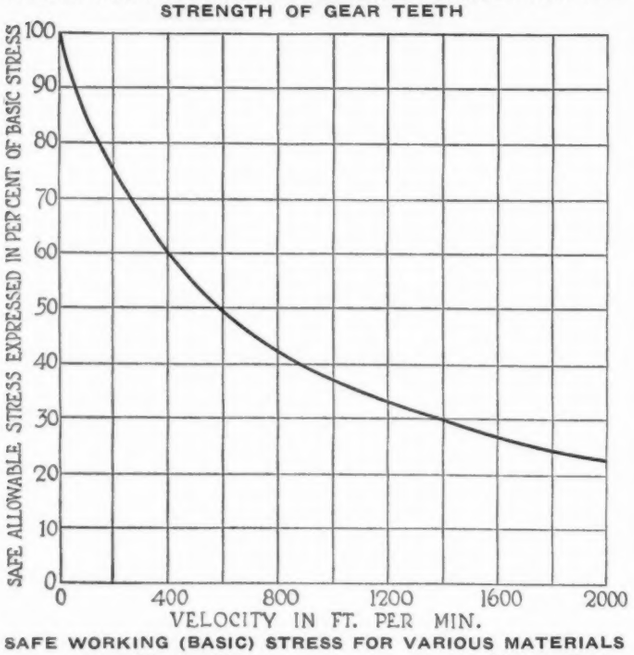
Certain materials seem to be satisfactory for automobile gears, in view of the small amount of service they get, but it is questionable if gears made of similar proportions and of the same materials working under full load torque all the time, and, therefore, under much greater surface pressures, will last as long as they should in tractor service. It seems to the writer that experiments should be made which would give some definite data on the relation of surface pressures and the degree of surface hardness necessary for a given length of service. These properties must bear some reasonable relation to one another for any given material, and certainly private investigations have been made which have brought forth information on the subject which would be of great value to the engineering profession.

There is also much information lacking on the subject of the strength of gear teeth. On account of the various shapes of teeth, no common rule can be used in figuring their strength and the problem becomes a complex one. For instance, we have the Brown & Sharpe 14½° tooth, the Grant 15° tooth, and a 20° tooth, all of which are of equal length

TABLE A
Materials for Gears

Material	Tensile Strength, Lb.	Elastic Limit, Lb.	Machining Quality	Characteristics
Close grained cast iron	24,000	.....	Cuts freely Good surface	Easily obtained — low cost—satisfactory for low pressures.
Close grain semi steel	31,000	.....	Cuts freely Good surface	Easily obtained — low cost—satisfactory for high or low speed and low pressure — wears well.
Cast steel	60,000	31,000	Machines good when annealed	Medium priced—strong and tough, loss due to defects sometimes large. Wears well—satisfactory for low speed—low pressure.
Carbonized and Heat Treated				
0.020 carbon steel, S. A. E. No. 1020	75,000	43,000	Care needed to avoid tearing	Affords good combiration of strength, toughness and hardness. Good for high speeds and medium pressures.
Heat Treated				
0.35 carbon steel, S. A.E. No. 1035	95,000	65,000	Machines good when annealed	Good combination strength, toughness and hardness. Good where high speed or heavy pressure prevails.
Heat Treated				
0.45 carbon steel, S. A.E. No. 1045	110,000	75,000	Machines good when annealed	Excellent strength, but more brittle than the previous steel. Suitable for high speeds and for steady heavy pressures. Wears well.
Heat Treated				
3½% nickel steel 0.20 carbon	130,000	99,000	Cuts hard with fine surface	Excellent strength, toughness and hardness. Very satisfactory for high pressures.
Heat Treated				
3½% nickel steel 0.40 carbon	155,000	130,000	Cuts hard with fine surface	Excellent strength, toughness and hardness. Suitable for very severe conditions; good for clash gears.
Heat Treated				
Nickrome forging steel	150,000	130,000	Machines good	Same physical advantages as above—easily heat treated. Excellent wearing qualities.
Chrome vanadium steel	190,000	150,000	Machines good	Same physical advantages as above—easily heat treated. Excellent wearing qualities.

VALUES FOR FACTOR S IN THE LEWIS FORMULA FOR THE STRENGTH OF GEAR TEETH



SAFE WORKING (BASIC) STRESS FOR VARIOUS MATERIALS

	Lbs. per Sq. In.		Lbs. per Sq. In.
Raw hide	5,000	Bronze	12,000
Cast iron	8,000	Cast steel	20,000
Cloth	18,000	Forged steel	25,000
Semi-steel	10,500	(Not treated)	

and which agree in all proportions except for the pressure angle. This, of course, varies the strength of the tooth in the ratio of the squares of the root thickness, which is the critical section of the tooth when figured as a cantilever beam, the load being applied at the outer edge of the tooth. In a rack gear of any given width, the 20 deg. pressure angle tooth is practically 25 per cent stronger than the 14½ deg. tooth. This ratio is not constant, however; in fact, it becomes slightly greater as the number of teeth in the gear becomes less. This is one advantage in favor of the 20 deg. pressure angle.

The most commonly used formula for these particular types of teeth is that originated by Wilfred Lewis,

$$W = SPFY \frac{600}{600 + V}$$ in which,

W = safe tooth load.
S = safe stress in lbs. per sq. in.
P = circular pitch in.
F = face.
Y = factor depending on the number of teeth in the gear and the pressure angle used.

This factor Y is governed entirely by the number and shape of the teeth. Tables of these values are given in all handbooks. The values of S for different materials, starting with cast iron, and for various velocities are given in the accompanying diagram. These values I believe can bear criticism for the reason that the allowable stress drops with an increase in speed in the same ratio for every material regardless of its physical properties. This certainly should not be the case. When we consider the ability of such materials as chrome vanadium steel to resist impact forces, as compared to the relative inability of other materials, such as cast iron, it seems absolutely foolish to apply the same rule to both. In fact, several large manufacturers to-day do not adhere to the Lewis recommendations for the allowable stress.

Previously we have seen the value of increasing the pressure angle when considering the strength of the gear tooth. Another way of increasing the load carrying capacity of the tooth is by shortening it in a manner similar to the Fellows 20 deg. stub tooth standard. The word standard as applied here is a joke, as the so-called Fellows system is far from a standard. However, they realized the value of the short tooth and made a system of tooth sizes which, as you know, uses the addendum, dedendum, and clearance of a small tooth in combination with a tooth of large pitch. The Fellows stub tooth system comprises the following tooth sizes: 4/5, 5/7, 6/8, 7/9, 8/10, 9/11, 10/12, 12/14. It will be seen that there is no definite ratio between the height of the tooth and its pitch, such as prevails in the Brown & Sharpe system.

Why should we not have a standard 20 deg. stub tooth which does have definitely fixed proportions based on the pitch, such as is exemplified in the 20 deg. stub tooth, proposed and outlined in the *American Machinist*, in June, 1907, by an eminent authority, Charles H. Logue? Another disadvantage with the Fellows system is that the range of tooth sizes is not adequate, especially in tractor work. The writer has been forced on several occasions to use stub teeth of larger pitch than any given in the table, these sizes being the 3/4 and 2/2½ pitch. Another disadvantage in the present stub tooth system is that there is no convenient or accurate formula for figuring the strength of these teeth, and there cannot be until considerable investigation has been made.

The customary practice has been to figure the strength of the regular 20 deg. tooth and then increase this strength in the proportion of the inverted pitch fraction of the stub tooth. This does not give the correct strength, as it assumes the root thickness of the full length tooth and stub tooth to be alike, and this is not the case. The root thickness of the 20 deg. stub tooth is less than that of the 20 deg. full length tooth of equal pitch measure, and, consequently, it has a smaller section modulus.

In thus harshly criticising our present gear tooth practices, it is hoped that a general discussion of the subject will be created, with a view of bringing out valuable individual information on the subject generally.

The writer feels that there is certainly room for great improvement and much enlightenment on this subject through research work, if we are really going to use our valuable resources to the very best advantages.

Italy's Exports Growing

ITALY occupies the position of the leading motor car exporting nation of Europe, according to official figures issued by the Ministry of Finance. For the first eight months of 1917 her motor exports increased 113.4 per cent, as compared with the corresponding period of 1915, and 96.4 per cent as compared with the first eight months of 1916. The largest proportion of vehicles consisted of motor trucks dispatched to the various Allied Powers. They numbered 6169, and had an average value of 14,375 lira each. Touring cars totalled 506 for the eight months, their average value being 17,568 lira each. They were practically all fully equipped cars for Allied staff service. Imports of motor vehicles into Italy were, on the other hand, low, the value being only 1,073,500 lira for 183 vehicles, of which ten were trucks. These figures show a drop of practically 70 per cent, as compared with 1915. It is rather curious to note that the average value of the motor trucks imported into Italy works out at the low figure of 2000 lira each, and that the average value of the touring cars is 6263 lira, or only a little more than one-third of that of the exported article.

Details of the Minerva Engine

(*Continued from page* 586)

are lubricated by spray, which is thrown from the crankshaft. The oil-filler pipe and breather pipes are designed with a view to preventing dust and dirt entering the crankcase. The governor is operated by pressure from the oiling system.

Heat from the exhaust gases is used to pre-heat the incoming mixture in the intake manifold, which latter is of the down-draft, hot-point type. At the point of division between front and rear cylinder blocks, a deeply corrugated baffle-plate is inserted and this plate, being heated by radiation from the exhaust manifold, serves not only the usual purpose of diverting the incoming mixture, but also to accomplish more thorough vaporization of the fuel particles.

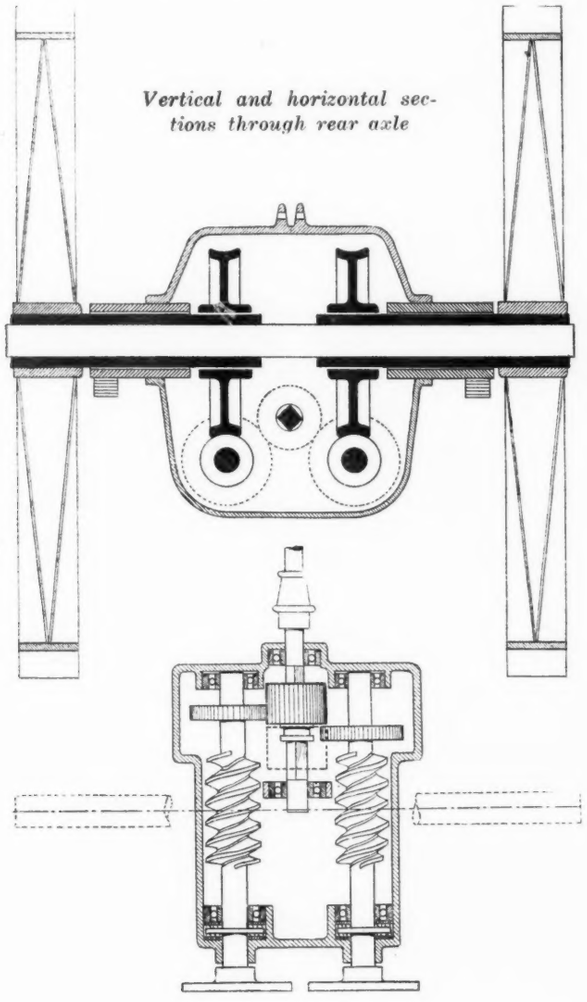
The Minerva engine is the product of the Minerva Engine Co., Cleveland, Ohio.

New French Vineyard Tractor

Double Worm Drive in Rear Axle—Tread 37 Inches—Spring-Suspended for Roads

By W. F. Bradley
Paris Correspondent of AUTOMOTIVE INDUSTRIES

PARIS, March 1—Official France realizes that during the next few years thousands of agricultural tractors will have to be put into service in order to relieve the shortage of labor caused by the war. At the present time most of these tractors are being brought from abroad, owing to the inability of the home factories to produce. Immediately after the war, however, it is intended that France shall produce her own tractors, and already business men and factory owners are studying this question and automobile manufacturers in particular are turning to the agricultural tractor as an article which is likely to keep their enlarged factories busy. On the other hand, the French Agricultural Department is encouraging inventors to produce tractors suitable for French conditions, and has instituted a technical section which examines all new designs, reports on them, and when considered suitable endeavors to interest manufacturers in their production.



Vertical and horizontal sections through rear axle

One such tractor, considered by the French Government official as a most interesting type, is the Howald-Gerster, the patents for which are held by M. Howald, with the automobile engineer S. Gerster responsible for the general design. This tractor has interested one of the leading French automobile factories and will be built by them in a short time.

Has Narrow Tread

Foreign agricultural tractors rarely take into consideration the fact that in order to work in French vineyards the overall width of the machine must not be greater than 39 inches. Also on small farms the tractor must have a short turning radius, and while designed for work in the fields it must be capable of operating on macadam and paved highways. Even French manufacturers have preferred, up to the present, to build a machine for large farms and open fields rather than for the small farms and for use between vines.

The Howald-Gerster has been designed with French vineyard conditions prominently in view. The width of the machine is 37 inches, allowing it to go between vines, which are always 39 inches apart. In a country where gasoline is costly, weight has had to be kept as low as possible, and the engine is no bigger than is necessary for the work to be done.

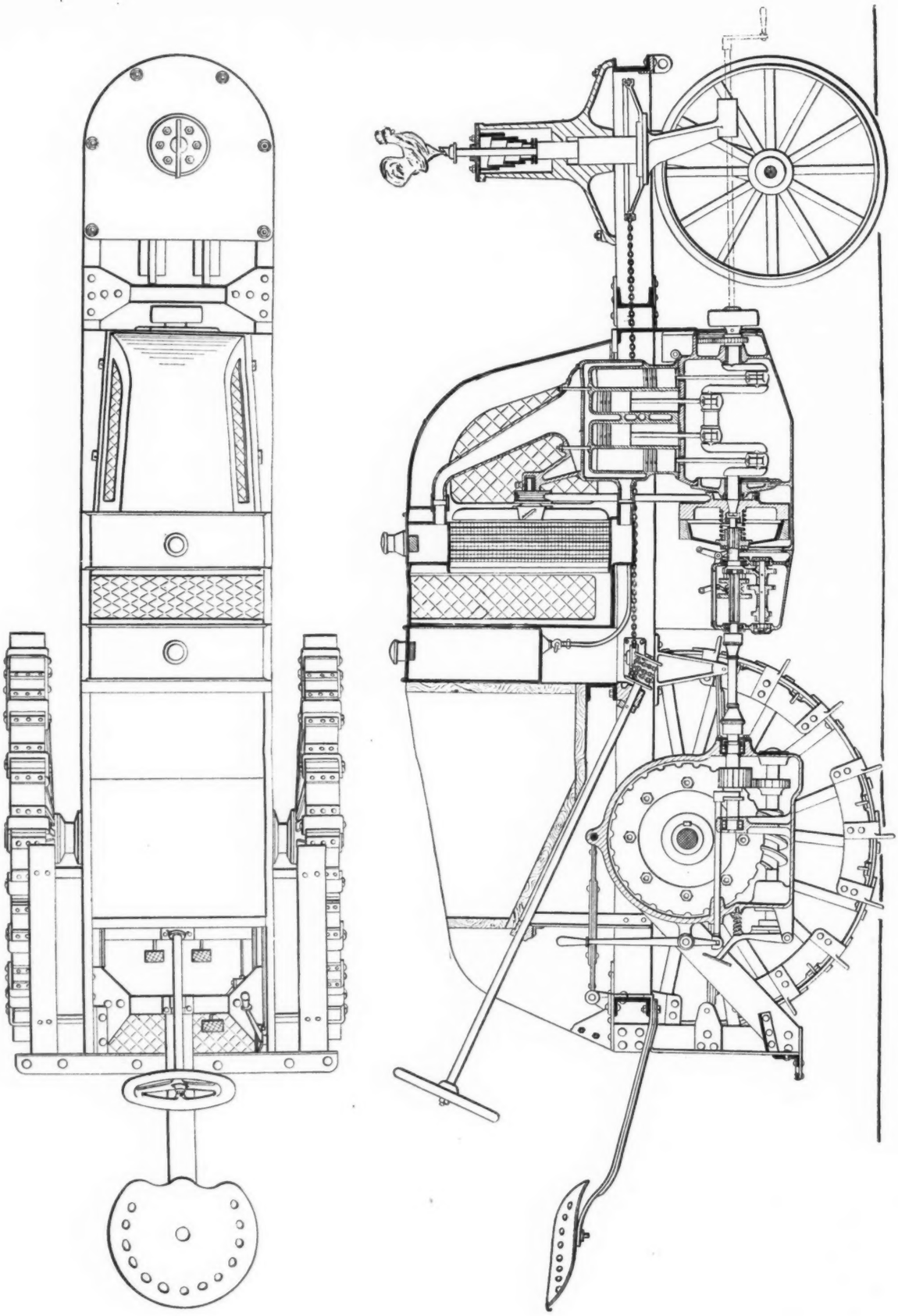
Mechanically the feature of the machine is independent worm drive to each of the rear wheels, it being possible to transmit the power through a differential to both wheels, or to either one or the other, as desired. By means of this feature, the machine, which has a wheelbase of 75 inches and an overall length of 130 inches, can turn in a circle of 90 inches radius, or only a little more than its own wheelbase.

The tractor is of the four-wheel type, with two main frame members solidly united by transverse members, and is driven by a four-cylinder block engine 62 by 145 mm. bore and stroke developing 10 hp. at 1000 r.p.m.

Except for its simplicity there is nothing very distinctive in the motor. It has a two-bearing crankshaft, forced feed lubrication to all parts, including the wrist pins, ignition is by high-tension, dust-proof magneto, the carbureter is a standard make, and cooling is by thermosyphon water circulation.

Radiator Back of Engine

The radiator is set back of the motor, not only to give greater accessibility, but to prevent dust being drawn in. As will be seen from the design, cooling has been well taken care of by the provision of a big head of water and straight, big-diameter inlet and outlet pipes. There is a fan in front of the radiator, the two blades of which sweep the entire cooling surface; the fan bracket is mounted on the water outlet collector, and the drive is by means of V-belt from a pulley on the crankshaft just ahead of the flywheel. An inverted cone clutch, lined with thermoid, is made use of, the clutch being independent of the flywheel.



Plan view and elevation, the latter partly in section, of Howald-Gerster vineyard tractor

Bolted to the basechamber is a three-speed gearset within a cast-iron housing, with the drive taken by means of a short propeller shaft to the rear axle housing. A broad-faced spur pinion on the extremity of the propeller shaft meshes with two pinions slightly offset in relation one to the other, on the two underneath worm shafts. The driving pinion has a sliding motion on its shaft, and only meshes with both worm shaft pinions when in its central position. Brought fully forward or pushed fully to the rear, it engages one road wheel only, leaving the other free. By reason of this feature of the design, the machine, which has a wheelbase of 75 inches and a total length of 130 inches, can turn in a radius of 90 inches. To further facilitate turning there is an independent brake on each of the worm shafts, making it possible to lock the wheel not receiving power.

As the machine is intended for use on roads as well as over soft ground, it is spring suspended front and rear. The rear suspension consists of a pair of semi-elliptic springs passing under the axle and shackled at their forward ends to brackets immediately below the frame members; these springs provide for the torque.

The drive is transmitted through a flexible connection consisting of three or four-leaf, flat-blade springs riveted together and uniting the upper central portion of the axle housing with the transverse rear frame member. A French patent has been secured on this general layout.

Patent Detachable Lugs

Another patented feature, adopted in order to make the tractor suitable for road or field, consists of detachable strakes for the driving wheels. The rims of the wheels are fitted with ribs of sufficient depth to give adherence on a made road. The detachable strakes employed on soft ground are united together in series of three by means of curved lateral plates having the same curvature as the wheel rim. When these strakes, with their lateral plates, have been placed in position on the rim of the wheel, they are held by a couple of flat-blade springs, the center portion of each spring exerting a pressure against the inner face of the rim and the two ends dropping into notches on the side plates. No other tool than a hammer is required to dismount the strakes. When the end of the spring has been knocked out of its notch, it can be placed diagonally in relation to the strake and drawn out. This system gives ample security, while avoiding the use of bolts and nuts.

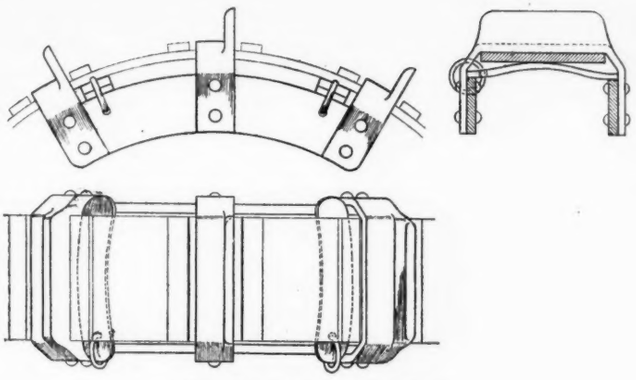
The steering wheels, which have a diameter of 23.5 inches and a rim width of 3.1 inches, are mounted on a central pivot and fork, with suspension by means of a rectangular section coil spring. The wheels are set very close together, but can be widened when desired for work on the road.

A similar system of variable track has been adopted for the driving wheels. While the minimum track is 37 inches, it can be increased to 51 inches by the interposition of couplings on the axle.

Automobile Type Steering

Steering is by means of an automobile type wheel, an inclined column and a pulley with chain, the ends of the chain being attached to the arms of the pivot and fork. The driver's seat overhangs the rear of the tractor, being sufficiently high to give him a good view ahead and at the same time to enable him to control the plow or other agricultural machine he may have in tow.

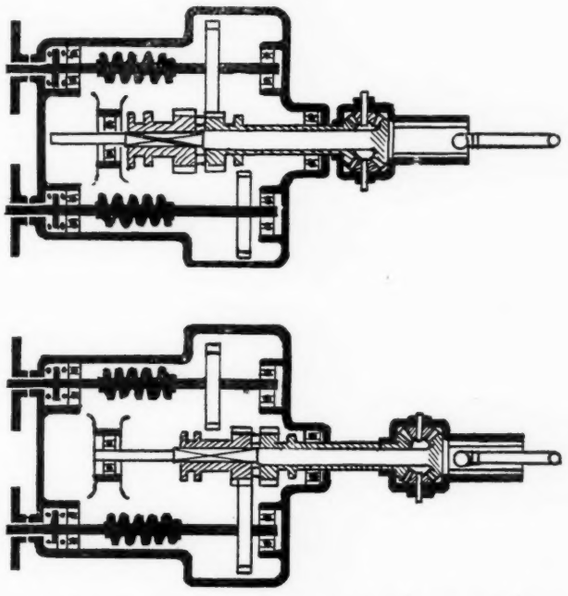
This tractor is intended to haul a two-furrow plow and to cultivate to a depth of 6 inches. The tractive effort required for this work varies from 660 to 880 pounds.



Detail of the driving lugs

On second gear, which is the one generally employed for plowing, and corresponds to a speed of 3 feet per second, or 2.05 miles per hour, the tractive effort at the drawbar is 680 pounds when plowing to a depth of 6 inches over a width of 20 inches in average earth having a density of 5.5 pounds per square inch. The required tractive effort corresponds to 3.7 hp., and, as the engine actually delivers 6 hp. at the drawbar, the margin is quite sufficient. On low gear the tractor advances at the rate of 2 feet per second, or about 1.3 miles an hour. On third gear the rate is 4.5 feet a second, or a little more than 3 miles an hour. It is intended that practically all plowing shall be done on second gear and road haulage only on third. On average ground, advancing at the rate of 3 feet per second, with a two-furrow plow covering a width of 20 inches, the surface turned over is 300 square feet per minute. During a ten hour day the machine can plow 3.8 acres of heavy ground and 5.4 acres of light ground. This estimate makes an allowance of 10 per cent for time lost in making turns, filling tanks, oiling, etc.

The tractor is handled in practically the same way as an automobile with a three-speed gearset. The only difference are two brake pedals, one for each worm shaft, and a separate lever to enable the drive to be transmitted to left or right hand wheel, or both, as desired. It is estimated that this tractor will be put on the market at an inclusive price of $1,700.



Illustrating convertible single and double wheel drive

The Rumpler Two-Seater Biplane

Constructional Details of an Enemy Machine Which Has Great Climbing Power, High Speed and a Lofty Ceiling—Fitted with 250 Hp. Engine

WHAT is considered one of the fastest of German war planes is the Rumpler C-IV biplane, which, although classed as a general-purpose machine, has a high flying speed and a ceiling of 21,000 ft. The climbing capacity of this machine is also very good, being given as 5000 meters in 35 minutes (16,000 ft. in 34 minutes). To enable the occupants to breathe freely at the enormous altitudes to which this machine can climb the German Air Board has recently introduced a special form of respirator. Both the upper and the lower wings have a sweep back of 3 deg. The dihedral angle is 2 deg., and the wings are staggered forward 0.6 meter (2 ft.). Contrary to the usual German practice, the trailing edge is rigid. The ribs, which are made of three-ply wood pierced for lightness, are spaced 0.3 meter (1 ft.) apart. A uniform angle of incidence of 5 deg. is used.

Forms of Wings

The upper wings are of trapezoidal form, with rounded angles. Above the fuselage the trailing edge is cut out, as shown in the illustration. The maximum chord is 1.70 meters (5.58 ft.). Each of the upper wings has nineteen main ribs and five compression struts of tubular steel. The ailerons are tapering, their chord varying from 0.5 to 0.65 meter (20 to 24 in.).

As in so many other German machines, the lower wings have rounded wing tips. As the radius of the arc forming the rear edge is longer than that of the front, the wing tip resembles somewhat that of a propeller blade. Each of the lower wings has 17 main ribs and four steel tubular compression struts.

There are two oblique interplane struts on each side of the fuselage. The inner front struts measure 0.105 m. (4.12 in.) in section, and the rear struts 0.130 m. (5.12 in.). The outer front strut measures 0.090 m. (3.54 in.), and the outer rear strut 0.085 m. (3.35 in.). The gap between the wings is 1.85 m. (5 ft. 8 in.) and the total lifting surface is 33.5 sq. m. (360 sq. ft.), of which the upper wing is 20 sq. m. (215 sq. ft.) and the lower wing 13.5 (145).

Tail Plane Bracing

The tail plane is non-adjustable, and not as deep as in previous types. Its leading edge, in plain view, is approximately a semicircle. This tail plane is supported on each side by struts attached at the other end of the bottom rail of the fuselage. Two other struts brace the tail plane to the vertical fin. The struts under the tail plane are provided with a series of sharp-edged metal points. Apparently, these serve the object of preventing the landing crew, when wheeling the machine about, from catching hold of these struts and possibly bending them. The elevator is in two parts, each of which is partly balanced by a triangular forward projection. The rudder, which is built up of metal tubes, is of the usual type, and the control cables pass inside the fuselage, being guided through small wooden tubes.

The construction of the fuselage is of the current type, with four longerons, and struts and cross members, braced by piano wire. Front and rear are covered with three-ply wood and the middle with fabric. The propeller (a Heine) has a diameter of 3.17 m. (10 ft. 5 in.). As on all other German machines, the propeller boss is enclosed in a "spinner."

The engine fitted on the Rumpler is either a 260-hp. Mercedes or a 250-hp. Maybach, both having six vertical cylinders. When the Mercedes is fitted it is slightly tilted to the right in order to allow the induction pipes to pass between the legs of the cabane. With the Maybach, which is more compact, this arrangement is not necessary. The motor is supplied with fuel from two tanks. The main one (about 58 gal.) is placed under the seat of the pilot; the second, the service tank (about 18.5 gal.) is placed at the back of the pilot, between him and the gun ring in the gunner's cockpit. The quantity of fuel carried allows of a flight of four hours' duration. The covering over the engine leaves the tops of the cylinders exposed, and incloses a Spandau machine gun operated by the motor.

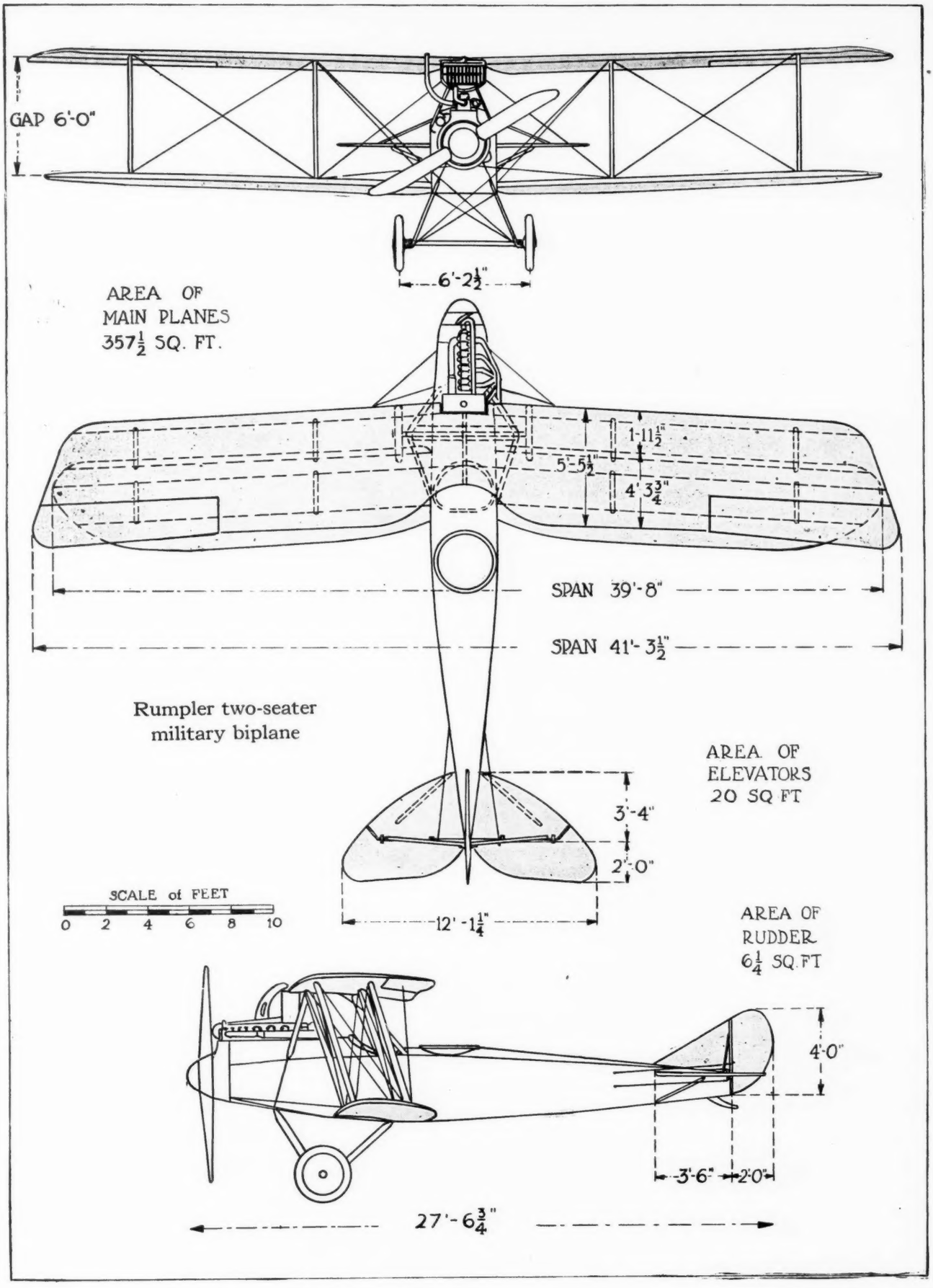
The exhaust pipes run from the six cylinders to a common chimney curving upward and backward. The chimney itself is divided about half way up into three branches, probably in order to obtain a certain amount of silencing effect. As in previous models, the radiator, which is semicircular in shape, is placed on the front legs of the cabane. In front of it is a series of small slats, which can be moved so as to be either parallel to or at right angles to the direction of flight. This makes it possible for the pilot to adjust the cooling according to the altitude at which he is flying.

Behind the motor is the pilot's cockpit, and behind him again that of the gunner. Supported on a gun ring in the rear cockpit is a Parabellum machine gun. Pilot and gunner are very close together. In the gunner's cockpit there is a bomb rack of the usual type, carrying four bombs. An opening in the floor permits of taking photographs, and the machine carries a wireless set. The landing chassis is of the V type, with rubber shock absorbers. There is no brake fitted on this machine. An external drift cable runs from the nose of the fuselage to the foot of the inner front interplane strut.

—

The Motor Industry

A COPY has been received of a new book entitled **The Motor Industry**, its growth, its method, its prospect, and its products; with an indication of the uses to which motor vehicles of all kinds are, or could be, advantageously applied. By Horace Wyatt, B. A., published by I. M. Pitman & Sons, 2 West Forty-fifth Street, New York. The book deals briefly with the history of motor car development and discusses the factors which have influenced that development. It seems to be written chiefly for the investor and for the man who wants a general knowledge of the motor car industry, for it does not go sufficiently into mechanical details to meet the requirements of a mechanic-driver nor is it of a technical character. The book was written in England and deals with the subject from a British viewpoint, though there are numerous references to automobile development in other countries.


GAP 6'-0"
6'-2½"
AREA OF
MAIN PLANES
357½ SQ. FT.
1-11½"
5'-5½"
4'-3¾"
SPAN 39'-8"
SPAN 41'-3½"
Rumpler two-seater
military biplane
AREA OF
ELEVATORS
20 SQ FT
3'-4"
2'-0"
SCALE of FEET
0 2 4 6 8 10
12'-1¼"
AREA OF
RUDDER
6¼ SQ.FT
4'-0"
3'-6"
2'-0"
27'-6¾"

Specifications of Airplane Propellers

As Issued by the International Aircraft Standardization Board, Covering Materials Used, Methods of Manufacture, Inspection and Testing

ONE of the latest sheets of specifications issued by the International Aircraft Standardization Board at Washington covers the manufacture of airplane propellers. It is reprinted below.

1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

Materials

2. (*a*) *Wood.*—Woods used for the manufacture of propellers for motors of more than 150 hp., or more than 1600 r.p.m., are to be black walnut, true mahogany, or quarter-sawed white oak.

For machines under 150 hp. and 1600 r.p.m., will also be allowed the use of West African mahogany, cherry, and birch. In any case, the manufacturer is not allowed to use a different material from that specified in the design without permission of the purchaser.

Thickness of the boards shall be 0.75 to 1.0 in., finished.

(*b*) The laminations of the propellers being of irregular shape, imperfections are allowable on edges and parts of boards that will be cut away in the shaping of the propellers, but the stock that goes into the propeller must be straight grain, free from curls, burls, and spiral grain, without knots, checks, dry rot, shakes, dote, or other imperfections, in entire accordance with the I. A. S. B. specifications Nos. 2W3-8 for the lumber.

Sapwood is not permitted in the finished blade, and is not allowed to extend in boss more than 0.75 in. from the edge of the boss, and must in that case be sound.

(*c*) The physical properties of the wood shall be as specified in the I. A. S. B. specification No. 3W1.

(*d*) Stock shall be dried to a moisture content of 7 per cent by methods given in the I. A. S. B. specification No. 3W2.

(*e*) The *glue* used shall conform to I. A. S. B. specification No. 2V2.

(*f*) Materials used for the *sheathing* of propellers for sea planes may be the following:

(1) Sheet copper in conformity to I. A. S. B. specification 3N8.
(2) Monel metal sheet in conformity to I. A. S. B. specification 3N21.
(3) Linen in conformity to I. A. S. B. specification 2F3.
(4) Cotton fabric in conformity to I. A. S. B. specification 2F4.

(*g*) The *spar varnish* used shall conform to I. A. S. B. specification 2V1; the *filler*, to I. A. S. B. specification 2V2. The priming varnish shall be made by dilution of spar varnish with about 2 parts of turpentine.

Manufacture

3. (*a*) Each board shall be sawed and planed in accordance with blue prints. After planing they shall be glued promptly to avoid absorption of moisture, and great care must be taken to keep the wood under uniform condition of temperature and humidity during all the operations.

(*b*) Boards shall be balanced before gluing, and heavy ends alternated so as to minimize the effect of variation in the density of the material.

(*c*) The boards shall be sawed for gluing in such a way that the grain follows the lamination of the propeller, avoiding any cross grain. At the same time, the boards shall be so arranged that the grain comes out on the edge, avoiding any flat grain.

(*d*) The practice of gluing edge pieces onto the boards in order to fill out at the boss is forbidden, unless special permission is given by the purchaser. In case such permission is given, the lamination on both sides of the boss widener must be of the full width of the boss; that is, no two laminations which have wideners glued to them shall be adjacent. Both the lamination and the boss widener shall be corrugated at the joint to increase the gluing surface. No splice or "dutchman" shall be permitted on the blade of the propeller. Defective joints shall not be filled with glue. The practice of gluing a thin strip of veneer to the blades will not be allowed.

(*e*) The glue room must be kept at a temperature of 90° to 100° F. (32° to 38° C.), and an average pressure in gluing of 150 pounds per square inch (0.11kg./mm.^{2}) shall be maintained. Care shall be taken to insure an even pressure on all the parts of the glued surface for not less than 10 hours or longer, at the option of the purchaser. The pressure in the gluing process must not be removed before the expiration of 8 hours after it is completed. This period may be increased at the option of the purchaser.

(*f*) The propeller shall stand at least two days after gluing, nor shall it be finished in less than two weeks after roughing out.

(*g*) The surface of the propeller shall be smoothly sandpapered before the filler is applied, and the curvature shall be true and smooth throughout the length of the blade. Irregularities of contour are not permissible.

Tolerances

4. (*a*) Propellers shall be inspected for pitch angle, alignment, blade form, and shape of section, as soon as they are finished by the manufacturer and shall come within the following tolerance limits:

	Portion of Blades More than 50 per Cent Radius from Axis	Portion of Blades Less than 50 per Cent Radius from Axis
Alignment within	0.0625 inch	0.0625 inch.
Error in fit of templets	0.01 × width of blade.	0.02 × width of blade.
Width of blade	0.075 × width of blade	0.01 × width of blade.
Thickness of section..	0.0625 inch	0.125 inch.

For the inner half of the blade length the deviation from the specified pitch angle shall not exceed ± 1.0° at any station, and the difference between the pitch angles at corresponding stations on opposite blades must not differ by more than 1.0°. For the outer half of the blade length the average deviation shall not exceed ± 0.3°, the maximum deviation shall not exceed ± 0.5°, and the difference between corresponding opposite averages and maximum shall not exceed 0.3° and 0.5°, respectively.

(*b*) The diameter shall conform to the drawings within plus or minus 0.125 inch. The inspector may accept propellers when the diameter is 0.50 inch under specified dimensions, providing not more than 1 propeller in 10 is more than 0.125 inch under the specified diameter.

(*c*) Blades on the same propeller shall be alike within the limits given above. For example, the thickness of the blade may be 0.0625 inch greater or less than specified, but two blades on the same propeller shall not differ in thickness by more than 0.0625 inch.

(*d*) Propellers shall be inspected for alignment at the time of shipment and shall track within 0.0625 inch. If the propeller is not over 0.315 inch out of track, it is permissible to correct the alignment by scraping the wood in the boss.

5. (*a*) Before application the fabric shall be scrubbed

thoroughly with hot water and soda, and after rinsing allowed to soak in hot water for four hours in order to remove all sizing from the cloth.

(*b*) The process shall be repeated until all the sizing is removed. The cloth shall be dried and applied to the blade in the glue room, with a standard temperature of 100° F.

(*c*) The blades shall be coated evenly with glue, and the cloth applied and ironed smooth, preferably with an electric iron.

(*d*) Twenty-four hours after gluing the fabric shall be given four coats of acetate dope, followed by two coats of varnish or enamel which conforms to I. A. S. B. specifications No. 2V1.

Sheathing of Propellers with Copper or Naval Brass

6. (*a*) Metal sheathing shall be set in flush with the blade. Rivets of the same material as the sheathing shall be spaced over the area of the sheathing. They shall be applied in such a way as to fit tightly without splitting the wood and shall be applied alternately from the face and the back. The rivets shall then be headed and filed to form a smooth surface. No rivets shall be driven closer than 1 inch from the propeller edge, except at the edge of the metal or in very small blades.

(*b*) A row of rivets about 0.625 inch apart shall be spaced along the edge of the sheathing.

(*c*) The rivets shall not exceed 0.085 inch in diameter and shall show a breaking load of at least 130 pounds (58.9 kg.) at the riveted end and 180 pounds (81.5 kg.) at the head end. The working stress due to centrifugal force shall not exceed 4,266 pounds per square inch (3 kg./mm.^{2}).

(*d*) Sheathing shall be formed to the exact shape of the blade before any rivets are placed.

(*e*) The rivets shall be applied in such a way that they do not follow the line of the grain.

(*f*) When the work is complete the tip shall fit snugly against the wood. Buckling or lifting of the metal shall be considered ground for rejection.

(*g*) Sheathing shall be perforated at the extreme tip by four holes 0.0625 to 0.0938 inch in diameter, to allow the moisture to be removed.

Finishing of Propellers

7. Propellers shall be finished by the application of 1 coat filler, 2 coats priming varnish, and 3 coats of spar varnish. Each coat should be allowed sufficient time to dry before the application of the next coat.

8. (*a*) The propellers shall be tested for balance after the shaping, and after each subsequent operation which affects the balance. For this test the propeller shall be mounted so that it can turn on a horizontal axis, and the sensitiveness of the mounting must be such that it will move at the application of 1 gram (equals 0.036 ounce) at a distance of 2 feet (61 cm.) from the axis.

(*b*) The balancing shall be done in a room free from air currents.

(*c*) The propeller when completed shall stand on the balancing machine in any position without persistent motion in any direction.

9. (*a*) One propeller of each new design shall be tested by running for at least 10 hours at rated speed on the engines for which it was designed.

(*b*) A centrifugal test of at least one hour duration shall be run at a speed of 10 per cent in excess of the rated speed. This test applies to one propeller of each new or of each unconventional design and to propellers made by inexperienced builders.

(*c*) The deflection of the tip in an axial direction shall not exceed 0.75 inch when the propeller is turning in free air at the rated speed unless greater deflection is an intended feature of the design. This requirement applies to propellers having a diameter of less than 10 feet (3.05 m.).

(*d*) Such additional tests as may be desired shall be stipulated for propellers of untried materials or of radical design, or larger than 10 feet.

Hubbing of Propellers

10. (*a*) The large boss hole shall be bored before roughing and shaping in order to insure perfect alignment.

(*b*) The fit of the hub in the large hole shall be neat and close, and the metal flange shall not show perceptible shake. The fit of the bolts in the wood shall be as tight as possible without danger of splitting the wood.

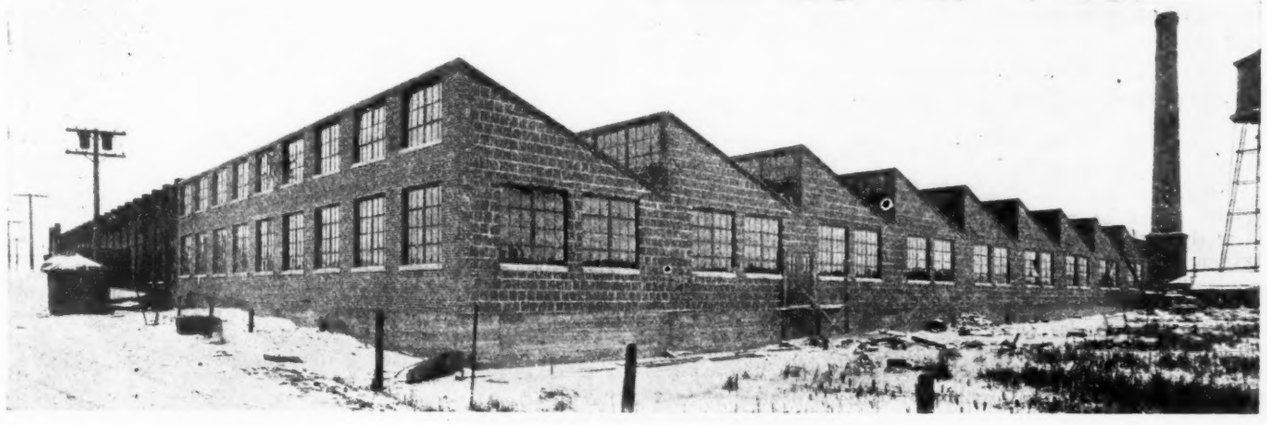
11. (*a*) The propellers shall be stamped in such a position on the boss as to be legible after the placing of the metal flange, with the following information: (1) Pitch, (2) diameter, (3) safe revolutions per minute, (4) whether right or left hand, and (5) serial number.

(*b*) On the blade shall be the manufacturer's trade-mark or name.

Addition to Berling Magneto Plant Opened

PRODUCTION has been started in the new addition to the factory of the Ericsson Mfg. Co., Buffalo, N. Y., which is shown in the accompanying photograph. This makes possible the doubling up of the former capacity. Heretofore the production facilities were limited, and made it impossible to use more than 400 or 500 employees, this necessitating day and night shifts in order to meet the demand.

The Ericsson Mfg. Co. started to manufacture the Berling magneto about seven years ago. To-day this magneto is made in one, two and four-cylinder models for motorcycles, four and six-cylinder models for automobiles and motor trucks, one, two, four, six and eight-cylinder types for marine engines, as well as six and eight-cylinder types for airplanes. The demand in the latter field, of course, is growing rapidly just now.



The FORUM

"Superheated Gas" Methods

By W. P. Deppé

IT IS proposed that railway congestion be relieved by the greater use of gas engine trucks, etc. But note the fundamental problems which the present use of gas engines, present methods of refining oils and crude oil production have brought into the limelight in recent months. The oil fuel problem is the only great economic problem which will grow more acute with the mere passing of time, whether the war goes on for five years or ends to-morrow.

Since 1902 gas engine use has increased more than 5000 per cent. Since 1902 the production of crude oils has increased only 600 per cent. Since 1902 the production of so-called refined motor fuels has increased about 1000 per cent.

While methods of refining oils, engine design, etc., have been somewhat improved in technical mechanical details, the method of injecting wet mixture of oil and air into engine cylinders has not been altered since the first modern four-stroke engine was used.

With present commercial fuels, made under any refining method, from one-third to one-half of each gallon of commercial gasolines is wasted so far as useful work is concerned. Besides, the sending of wet fuel mixtures into engine cylinders dilutes the lubricating oils and causes further serious waste of lubricant, damage to engine metals, etc., as openly admitted by the leading engine builders, vehicle makers, engineers in noted engineering societies, etc.

Each interest is sitting tight and passing the buck to the uninformed public, which has most liberally supported the third largest industry in America. The wonderful development of this industry to date has been unprecedented in industrial history.

Stocks of Crude Dwindling

The Bureau of Mines and the Oil Administrator call attention to rapidly dwindling stocks of crude oils in storage, yet American engine builders are turning out about 2,000,000 gas engines per year, each of which requires some wildcatter to find wells to produce 65 barrels of crude oil per year, so long as each gas engine operates, in order to permit oil refiners to produce 13 barrels of suitable fuel oil for the carbureting methods used by engine builders.

Superheated methods of carburetion permit the oil refiners to double fuel oils over night by merely dumping a barrel of kerosene into a barrel of gasoline, thus making 25 barrels of fuel oil for motors out of each 65 barrels of crudes the wildcatter must find each year for each engine turned loose on the world of industry.

Superheated gas methods permit the use of approximately 40 barrels of crudes out of each 65 found. But the engine builders feel they cannot spend tens of dollars to permit individuals buying engines to save hundreds of dollars per annum.

Prerequisites for Using Kerosene as Motor Fuel

By W. L. Dempsey

THE power of an internal combustion engine varies directly with the number of atoms of carbon, hydrogen and oxygen taken into the cylinder in proper proportions. The whole automotive industry knows only too well that there is no difficulty experienced in getting enough carbon and hydrogen into the cylinder (and into the crank case also). Any carbureter and any kind of a manifold with or without a hot spot will always supply enough fuel, especially so when kerosene is being used. The problem of successfully using kerosene as motor fuel depends upon furnishing a sufficient amount by weight and not by volume, of oxygen-bearing air, to combine with the fuel in the proper proportions. The amount of air which it is necessary to supply in addition to that taken in with the fuel is exactly equal to the reduction of the air in the gaseous charge due to the heat necessary to gasify the kerosene or other heavy oil. Until this additional weight of air is supplied, more kerosene will continue to be wasted than is transformed into foot-pounds.

Expansion Due to Heating of Charge

A pound of kerosene requires approximately fifteen pounds of air, to insure complete combustion. One cubic foot of air at standard pressure at 60 deg. F. weighs 0.08075 of a pound and, since the weight of gases varies as their density and since air expands 1/493 times its volume with every degree of heat added and every distilled hydro-carbon fuel requires a temperature greater than that at which it was distilled, in order to produce a dry gas, it will require a temperature of not less than 500 deg. to gasify kerosene, which would double the volume of the air and cut down the efficiency of the motor 50 per cent—unless provision is made in the design of the engine to force into the cylinder an amount of oxygen equal to the loss in oxygen and air of the regularly inducted charge due to the heat of gasification. This is the first and absolutely necessary step to be taken to improve the performance of kerosene motors.

Kerosene must not only be vaporized; it must be gasified by heat, at a temperature not less or equal to, but greater than that at which it was originally distilled. The sole function of a carbureter is to break up, to comminute as finely as possible, the fuel, and mechanically mix and mingle it with the air, in the proper proportions. With highly volatile fuels the velocity of the air, in the act of carburetion, together with the radiation from the motor, supplies the necessary heat, but no such temperatures as are necessary to form a dry gas from kerosene can be supplied. Therefore some method of heating, either by the hot spot or heated manifold, is indispensable.

Character of Fuel Changing

The ever increasing demand for gasoline has compelled the refiner to introduce new processes and constantly raise the temperature of distillation in order to extract the last drop possible from crude oil, so that the kerosene of commerce is not only distilled with initial temperatures of from 450 to 500 deg., but there is not left in it a single drop of the more volatile oils. It therefore becomes imperative not only that the kerosene motor shall be provided with means for adding additional air to that which is taken in with the fuel, but means must be supplied for maintaining at all speeds an air temperature of from 400 to 500 deg.

Revolving Disk for Spraying Kerosene

By R. C. Sackett

IT seems to me that, to design a satisfactory kerosene carbureter, some mechanical device must be used for vaporizing or finely dividing the kerosene spray.

Could this not be accomplished by placing in the carbureter at a point where the kerosene would drop or be sprayed onto it a very rapidly revolving small disk with a roughened surface? The result would be that this disk, rotating at a high rate of speed, would create a mist or vapor of kerosene. It would have the same effect on the dropping kerosene that an emery grinder running at a high rate of speed has upon the grinding liquid used in the automobile shops. That is, it is broken up and thrown off the wheel in a very finely divided spray.

The Draftsman, the Purchasing Agent and the Forge Shop

A Three-Cornered Combination Which Often Fails to Produce the Desired Results in the Shop

By J. Edward Schipper

IN the manufacture of machinery comprising drop forgings, the draftsman will first make his design, and then the purchasing agent will be called in to buy the forgings. Occasionally the foreman of the forging shop will be called in for consultation regarding the practicability of manufacture, but unfortunately this is not always done. Probably the chief reason for the difficulties encountered is that the draftsman quite often knows relatively little regarding forging practice. It is very rare that the draftsman has had practical shop experience in this line of work, and consequently he cannot appreciate what the forge men must know in order to satisfactorily and intelligently produce the parts desired. These points were covered very completely in a paper recently read by E. J. Frost, president of the Frost Gear & Forge Co., Jackson, Mich., before the Drop Forge Association.

Some extracts from this paper clearly illustrate the difficulties which are sure to occur when there is lack of co-operation between the draftsman and the man in the shop. It is a fact that sometimes the machining processes are entirely overlooked, either by the purchasing agent or by the draftsman, with the result that a forging which may not be expensive in first cost may come very high in the end owing to the greatly increased cost of machining.

Shop Experience Necessary

Draftsmen require a certain amount of knowledge that can only be acquired by actual experience in the shop. One point upon which they are generally weak is the necessary tolerance for drive, press, shrink and running fits. They are also weak regarding the fitting of keys, size of drill holes for rough and finished bolts, various qualities of surface desired in lathe and planer work, and hundreds of other matters which, if not shown on the drawing, must be left to the discretion of a foreman whose time should be devoted to manufacturing problems.

Efforts are being made by the Drop Forge Association to simplify a great many of these problems by standardization of fits and other details, and a tentative program has been laid out to handle situations of this nature which may arise.

One point which cannot be insisted upon too strongly is that practical drop forgers should be called in for consultation and advice when new designs are being worked out, or at least preliminary drawings or sketches should be sent to prospective sources of supply to get constructive suggestions and to avoid the revising of completed designs and details. Most drop forgers would be more than willing to render this service for their regular customers, if not for the trade at large, and in some instances the saving would be enormous.

In the case of large automobile forgings, such as axles, crankshafts, camshafts, and the like, tolerances and amounts for finish should be established within the practice of a well-organized forge shop, and it should be understood that any requirement beyond this will call for a corresponding increase in price, as will also extra-thin ribs or webs, which cool too rapidly in the dies, thus necessitating reheating or causing folds or cold shuts.

In the case of axles, the method to be employed in machining has much to do with the accuracy of forging required, and especially the relative accuracy of the various parts. The tendency during the past 2 years has been to compel the drop forger to produce an axle of such refinement that the machining cost will be brought to the lowest possible amount. This would be fair enough if the price was commensurate with the extra care and work entailed, but with a return to normal business conditions we may have a return to the old competitive methods so disastrous to peace of mind and condition of pocketbook.

It seems that an over-all tolerance of ⅛ in. should be as close as is required between knuckle-pin centers, although some axle manufacturers are demanding 1/16 in. This is hard to maintain through heat treatment, especially if the composition of the steel varies much.

An understanding should be had at the time of bidding on the work as to whether the flat surfaces on the spring pads for the U-bolt nuts are to be put in padding or are to be afterward machined.

In regard to twist in an axle, some purchasers are requiring that the yokes come absolutely to gage, but this practice is unfair unless an additional price is paid. At least 1/32 in. on the knuckle-pin centers should be allowed for distortion in this respect.

The yokes should have an allowance of from 1/16 in. to 3/32 in. on each surface for finish, plus the necessary forging draft. Restriking of the spring pads in order to conform to the curvature of the springs should be specified in drawings if wanted.

Crankshafts Have Vagaries

Coming to the crankshafts, there are such vagaries in the design that it is extremely hard to make definite statements; but, generally speaking, there should be allowed more stock on the cheeks where finished, as it is impossible to allow but 1/16 in., as is sometimes asked, and still be sure of cleaning up in machining. This is especially true of some alloy steels.

Frequently drawings show a rectangular section for that portion of a crankshaft connecting the shaft with the crank pin. This should be stopped, and the drawings should show the forging draft and also indicate finish, if required, as the forger does not know whether the draft is to be included or added. Where flanges are wanted on a crank it naturally will be necessary to have

draft produced in the hammer, and this should be considered in the design. If the flange is large, and must be made on the upsetter, side draft would not be necessary, but the expense of the extra heat should be considered.

At the Frost factory, the making of gear blanks forms a large part of the work, and these blanks are made chiefly from alloy steel. It is found that on nearly everything, from 1/16 in. to 3/32 in., finish on each surface makes for good machining conditions on turret lathes. Where it is necessary to add draft, the finish allowance at the corner is made 1/16 in., and the draft, of course, has to be machined off. In the case of wide faces this may give excessive stock, but that cannot be helped, except by the use of the upsetter.

Frequently controversies arise over the subject of countersinks for centering. Generally speaking, when the first operation on the forging is on the drill press, it is desirable to have the center in, but if it is on a turret lathe the center is objectionable and should be omitted. The customer's drawings should invariably cover this point.

Some shops require that clutch jaws be made in the forging so as to leave a minimum of stock for machining, while others prefer to mill from the solid, as the removal of the extra stock is more than offset by the extra facility in setting up on the miller. This should be specified by the customer and should be known at the time of estimating, as it has much influence, not only on the cost of making the dies, but also on the life of the dies.

In connection with small work, there is another item that is frequently a subject for contention, and that is ends of pieces that require threading. It seems bad practice to attempt to thread rough forgings, but the fact remains that some customers require it, and in one instance a certain drop forger was compelled to make new dies because he had allowed stock for machining before threading; this in spite of the fact that the drawings did not specify the method to be used.

Where there is likely to be interference of unfinished surfaces, customers should furnish assembly drawings. In one case in point a wheel hub unfinished surface came very close to a pressed metal cap, and a better understanding of the requirements allowed the drop forger to get from 1500 to 2000 more forgings from the dies before resinking, without detriment to the product.

Rex All-Season Tops

SEVERAL styles of convertible or all-season tops have been developed by the Rex Mfg. Co. of Connersville, Ind. They include sedan, coupé and roadster types. When it is desired to prepare the car for summer use the side sections are removed bodily and thus the dead weight carried is materially reduced.

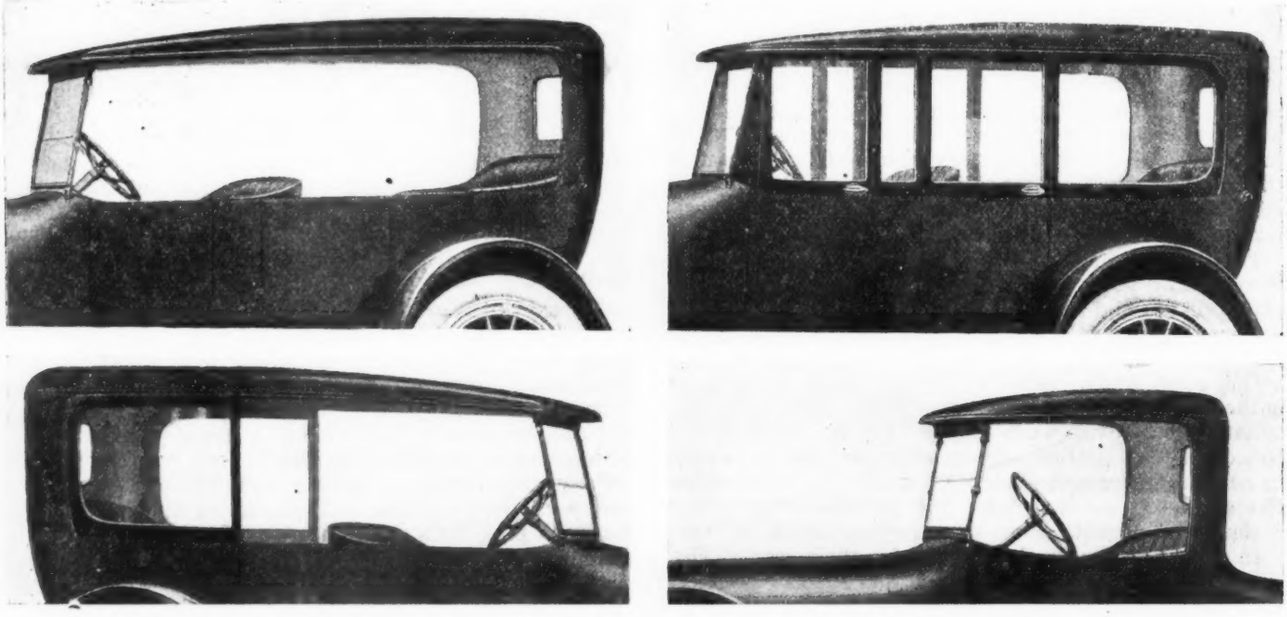
The door windows have upper glass panes held by non-rattle screw fasteners, and slide in velvet-covered channels. Rubber bumpers are provided on which both top and bottom glasses rest. With all windows removed the sides are wholly unobstructed.

The top is specially designed to harmonize with the body lines of the make of car with which it is used, though its mechanical features and general appointments are standard. The door and outer sections are held in position by attaching irons. When these are removed the holes are covered by leaving the plates in position, where they are firmly held by the cap screws.

The Rex top is built of hard wood, mitred and mortised and iron-braced. The back and the rear sections of the roof are reinforced with sheet steel. The water-proof fabric cover overlies a layer of wadding and the whole is finished for all-weather service in any specified color. The interior finish is made to match the upholstery of the car.

A special patented latch, used with the exterior coach handles, enables opening doors from both inside and outside.

WE have received from the Norman W. Henley Publishing Co., New York, a copy of a wall chart for the instruction of aviators and aviation engine repair men. The chart contains a large scale halftone cut of a six-cylinder aircraft engine partly in section, together with smaller sectional views of the carbureter and magneto. On the margin of the chart are given the different causes of trouble that may occur with an aircraft engine, the symptoms of these troubles and their remedies, together with certain other hints regarding the operation and maintenance of aircraft engines. The chart sells for 50 cents a copy.



Appearance of Rex all-season convertible tops: Above—left, top open; right, closed. Bottom—left, partly inclosed; right, coupé top open

Contracts for Class B Trucks

Complete List of All Contracts for Parts and Complete Assemblies—List Indicates Value of Standardization in War-Time Manufacture

IN the attack on the standardized war truck the statement has been made that the initial order for 10,000 trucks had never been fully placed, and that while original orders for this number had been placed some companies had refused to take such orders. Malicious rumors to this effect have been current for some time, and to set them at rest AUTOMOTIVE INDUSTRIES asked for a complete list of contracts showing the names of concerns with which contracts have been signed for the manufacture of parts entering into these 10,000 Class B trucks, as they are officially known.

The following list, which has been made public by the Quartermaster's Department, not only shows the names of those concerns that have signed contracts for manufacture of the parts, but it also contains the names of the different truck makers who have signed contracts to assemble all of these 10,000. This list should set at rest those rumors that even the contract for the 10,000 had not all been taken by assemblers, and that instead of contracts for 10,000 being placed there were only contracts placed for 7000.

Most Comprehensive List Issued

This list is one of the most comprehensive covering a line of contracts that has been made public up to this time, and is a good indication of how well scattered have been the contracts for these 10,000 war trucks. The list shows that there has not been any placing of contracts with one company in a certain line, but rather a fair spreading of them over a wide range of factories. A few examples of this follow:

Frames are being made by five different companies; radiators by eight different companies; steering gears by four companies; magnetos by three companies; motors by four companies; transmissions by four companies; clutches by three; spare assemblies by five; mufflers by four; radiator guards by five; batteries by seven; lamps by four; cape tops by four; and so through the complete gamut of parts. These contracts have been spread over a great many States; in fact, the complete scheme of contracts shows how successful has the general scheme been, and indicates the extent to which standardization can be relied upon for spreading manufacture over wide areas.

List of Contracts Under Direction of the Motors Division

Name and Location	Quantity	Item
Garford Motor Truck Co., Lima, Ohio.	900	Chassis
Locomobile Co. of America, Bridgeport.	1,650	Chassis
Pierce-Arrow Motor Car Co., Buffalo	2,300	1½-ton trucks
	1,000	5-ton trucks
Packard Motor Car Co., Detroit.	4,800	3-ton trucks
Harley-Davidson Motor Co., Milwaukee	8,125	Motorcycles
Hendee Mfg. Co., Springfield, Mass.	5,500	Motorcycles
Mulholland Co., Dunkirk, N. Y.	500	Truck bodies, Type A
Hercules Buggy Co., Evanston, Ind.	400	Truck bodies, Type A
International Harvester Co., Chicago.	1,000	Truck bodies, Type A
Theodor Kundtz Co., Cleveland.	550	Truck bodies, Type A
Grand Rapids School Equipment Co., Grand Rapids	6,400	Truck bodies, Type B
Continental Car Co., Louisville Ky.	2,000	Truck bodies, Type B
Eagle Iron Works, Auburn, N. Y.	1,200	Truck bodies, Type B
International Harvester Co., Chicago.	9,000	Truck bodies, Type B
Edw. G. Budd Mfg. Co., Philadelphia.	5,000	Truck bodies, Type B (steel)
J. G. Brill Co., Philadelphia	300	Truck bodies, Type B
	125	Truck bodies, Type A
Hopkins Mfg. Co., Hanover, Pa.	200	Truck bodies, Type B

Parts and Assemblies Class B Standard Motor Trucks

Continental Motors Corp., Detroit.	6,400	Motors
Wisconsin Motor Co., Milwaukee.	1,000	Motors
Waukesha Motor Co., Waukesha.	2,000	Motors
Hinkley-Motor Corp., Detroit.	1,200	Motors
Timken-Detroit Axle Co., Detroit.	5,000	sets Axles
The Sheldon Axle Co., Wilkesbarre.	2,500	sets Axles
American Ball Bearing Co., Cleveland.	2,000	sets Axles
Covert Gear Co., Lockport, N. Y.	5,000	Transmissions
Warner Gear Co., Muncie Ind.	4,000	Transmissions
T. W. Warner Co., Muncie, Ind.	2,000	Transmissions
Muncie Gear Co, Muncie, Ind.	1,000	Transmissions
Covert Gear Co., Lockport, N. Y.	4,000	Clutches
Warner Gear Co., Muncie, Ind.	4,000	Clutches
Detroit Gear & Machine Co., Detroit.	4,000	Clutches
Covert Gear Co., Lockport, N. Y.	5,000	Controls
Warner Gear Co., Muncie, Ind.	6,000	Controls
Dayton Engineering Laboratories Co., Dayton	10,000	Generators
Bijur Motor Lighting Co., Hoboken.	2,000	Generators
Eisemann Magneto Co., Brooklyn, N. Y.	5,000	Magnetos
Splitdorf Electrical Co., Newark.	3,000	Magnetos
Ericsson Mfg. Co., Buffalo.	2,000	Magnetos
Remy Electric Division, United Motors Corp., Anderson.	12,000	Distributors and coils
Kellogg Switchboard & Supply Co., Chicago, Ill.	12,000	Switches
Splitdorf Electrical Co., Newark.	500	Magnetos
C. A. S. Products Co., Columbus.	2,500	Steering gears
Warner Gear Co., Muncie, Ind.	3,000	Steering gears
Ross Gear & Tool Co., Lafayette, Ind.	1,000	Steering gears
Gemmer Mfg. Co., Detroit.	5,000	Steering gears
Fedders Mfg. Co., Buffalo.	2,000	Radiators
McCord Mfg. Co., Detroit.	2,000	Radiators
National Can Co., Detroit.	1,000	Radiators
Perfex Radiator Co., Racine.	1,000	Radiators
Long Mfg. Co., Detroit.	4,000	Radiators
English & Hersick Co., New Haven.	1,000	Radiators
G. & O. Mfg. Co., New Haven.	1,000	Radiators
Rome-Turney Radiator Co., Rome, N.Y.	1,000	Radiators
Savage Arms Corp., Sharon, Pa.	2,500	Frames
A. O. Smith Corp., Milwaukee.	2,000	Frames
The Hydraulic Pressed Steel Co., Cleveland	2,000	Frames
Detroit Pressed Steel Co., Detroit.	2,000	Frames
Parish & Bingham Co., Cleveland.	2,000	Frames
Detroit Steel Products Co., Detroit.	4,000	Springs (front)
	4,000	Springs (rear)
Standard Parts Co., Cleveland.	8,000	Springs (front)
	6,000	Springs (rear)
The Mather Spring Co., Toledo.	6,000	Springs (front)
	6,000	Springs (rear)
Sheldon Axle & Spring Co., Wilkesbarre.	4,000	Springs (front)
	4,000	Springs (rear)
The Cleveland Canton Spring Co., Canton, Ohio.	4,000	Springs (front)
	4,000	Springs (rear)
Schwarz Wheel Co., Philadelphia.	500	Sets wheels
Hayes Motor Truck Wheel Co., St. Johns, Michigan.	2,700	Sets wheels
Standard Wheel Co., Terre Haute, Ind.	300	Sets wheels
The Auto Wheel Co., Lansing.	500	Sets wheels
Prudden Wheel Co., Lansing.	250	Sets wheels
Dayton Steel Foundry Co., Dayton.	1,250	Sets steel wheels (40 x 10)
Michigan Malleable Iron Co., Detroit.	750	Sets steel wheels (40 x 10)
Standard Steel Castings Co., Cleveland.	2,000	Sets steel wheels (40 x 10)
Dayton Steel Foundry Co., Dayton.	1,000	Sets steel wheels (40 x 12)
Michigan Malleable Iron Co., Detroit.	250	Sets steel wheels (40 x 12)
Standard Steel Castings Co., Cleveland.	1,500	Sets steel wheels (40 x 12)
Otis Elevator Co., New York, N. Y.	150	Sets steel wheels (40 x 10)
	100	Sets steel wheels (40 x 10)
Prudden Wheel Co., Lansing.	500	Sets wood wheels
Bimel Spoke & Auto Wheel Co., Portland, Ind.	500	Sets wood wheels
Hayes Mfg. Co., Detroit.	8,000	Seat Assemblies
C. R. Wilson Body Co., Detroit.	3,000	Seat Assemblies
Michigan Stamping Co., Detroit.	8,000	Dashes
International Metal Stamping Co., Detroit.	3,000	Dashes
International Metal Stamping Co.	5,000	Hoods
Hayes Mfg. Co., Detroit.	6,000	Hoods
	11,000	Fenders (pairs)
	5,000	Fan shrouds
Michigan Stamping Co., Detroit.	6,000	Fan shrouds
Geuder, Paeschke & Frey, Milwaukee	5,500	Feed tanks
	5,500	Reserve tanks
Kardell Bros. Co., Utica, N. Y.	5,000	Feed tanks
	5,000	Reserve tanks

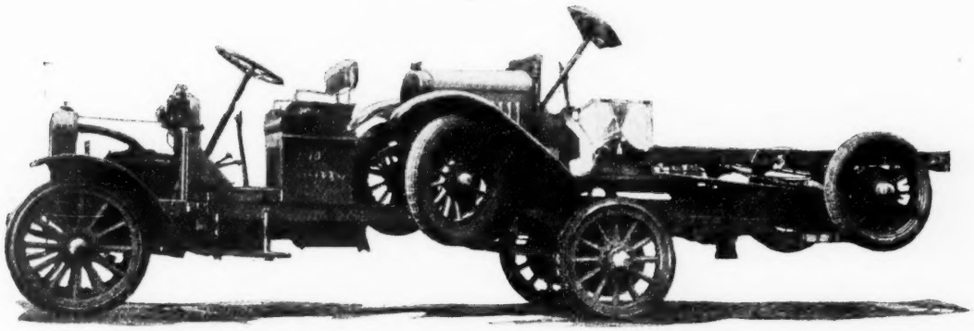
Hartford Auto Parts Co., Hartford...	2,000	Universal joints, rear
Kinsler-Bennett Co., Hartford.....	2,000	Universal joints front
Peters Machine & Mfg. Co., Cleveland.	2,500	Universal joint assemblies
Spicer Mfg. Corp., Plainfield.....	4,000	Universal joint assemblies
Universal Machine Company, Bowling Green, Ohio	3,500	Universal joint assemblies
Philadelphia Storage Battery Co., Philadelphia.	2,000	Batteries
Prestolite Co., Indianapolis.....	3,000	Batteries
U. S. Light & Heat Corp., Washington.	2,500	Batteries
Vesta Accumulator Co., Chicago.....	2,000	Batteries
Utility Battery Co., Chicago.....	1,000	Batteries
Willard Storage Battery Co., Cleveland.	2,500	Batteries
Detroit Battery Co., Detroit.....	1,000	Batteries
Guide Mtr. Lamp Mfg. Co., Cleveland.	2,500	Sets lamps
Edmunds & Jones Corp., Detroit.....	3,000	Sets lamps
C. M. Hall Lamp Co., Kenosha.....	4,500	Sets lamps
Indiana Lamp Co., Connersville, Ind..	1,500	Sets lamps
Barbee Wire & Iron Works, Lafayette, Ind.	3,000	Radiator guards
Buffalo Pitts Co., Buffalo.....	2,000	Radiator guards
Stewart Iron Wks. Co., Cincinnati....	2,000	Radiator guards
Gier Pressed Steel Co., Lansing.....	3,000	Radiator guards
Van Dorn Iron Wks., Cleveland.....	2,000	Radiator guards
Michigan Stamping Co., Detroit.....	6,000	Dust pans
J. W. Murray Mfg. Co., Detroit.....	3,000	Dust pans
H. W. Johns-Manville Co., New York.	2,000	Odometers
Stewart-Warner Speedometer Corp., Chicago.	10,000	Odometers
Schweppe & Wilt Mfg. Co., Detroit...	3,000	Reach rods
Michigan Plant Steel Products Co., Detroit.	5,000	Reach rods
Cincinnati Ball Crank Co., Oakley, Cincinnati	3,500	Reach rods
Schweppe & Wilt Mfg. Co., Detroit....	2,500	Sprag assemblies
Gier Pressed Steel Co., Lansing.....	2,500	Sprag assemblies
Detroit Pressed Steel Co., Detroit....	2,500	Sprag assemblies
Stewart Iron Wks., Cincinnati.....	3,000	Sprag assemblies
Thompson Mfg. Co., Des Moines.....	3,500	Sprag assemblies
Michigan Plant Steel Products Co., Detroit, Mich.	7,000	Crank assemblies
Stromberg Motor Devices Co., Chicago.	1,250	Carbureters
Zenith Carbureter Co., Detroit.....	1,250	Carbureters
Stromberg Mtr., Chicago.....	8,300	Carbureters
Mich. Stamp. Co., Detroit.....	6,000	Bumpers
Salisbury Wheel & Axle Co., Jamestown, N. Y.	5,000	Bumpers
Gramm-Bernstein Mtr. Truck Co., Lima, O.	1,000	Assemblies
Kelly-Springfield Mtr. Truck Co., Springfield, O.	500	Assemblies
Indiana Truck Corp., Marion, Ind...	500	Assemblies
Service Mtr. Truck Co., Wabash, Ind.	500	Assemblies
Republic Mtr. Truck Co., Alma, Mich..	1,000	Assemblies
Pierce-Arrow Mtr. Car Co., Buffalo..	1,000	Assemblies
Selden Truck Sales Co., Rochester..	1,000	Assemblies
Bethlehem Motors Corp., Allentown...	700	Assemblies
Diamond T. Motor Car Co., Chicago.	500	Assemblies
	150	Assemblies
United States Mtr. Truck Co., Cincinnati.	500	Assemblies
Brockway Mtr. Truck Co., Cort[illegible] N. Y.	500	Assemblies
	150	Assemblies
Velie Mtrs. Corp., Moline.....	500	Assemblies
Sterling Mtr. Truck Co., [illegible]ukee..	500	Assemblies
Garford Mtr. Truck Co., Lima, Ohio..	1,000	Assemblies
Oldberg Mfg. Co., Detroit.....	3,000	Mufflers
Michigan Stamp. Co., Detroit.....	2,000	Mufflers
Gemco Mfg. Co., Detroit.....	3,000	Mufflers
Xardell Brothers Co., Utica.....	3,000	Mufflers
Standard Parts Co., Cleveland.....	5,000	Draw bar assemblies
Savage Arms Corp., Sharon, Pa.....	3,000	Draw bar assemblies
Salisbury Wheel & Axle Co., Inc., Jamestown, N. Y.....	3,000	Draw bar assemblies
Steel Products Co., Cleveland.....	8,000	Rear spr. shackle pins
	8,000	Rear spr. frt. brack. pins
	24,000	Frt. spr. hangers and shackle bolts
	8,000	Engine support bolts (front)
	22,000	Engine support bolts (rear)
	7,000	Rear spr. shackle pins
	7,000	Rear spr. frt. brack. pins
Brown Co., Syracuse	21,000	Frt. spr. hangers and shack. bolts
	9,000	Frt. spr. hangers and shack. bolts
	7,000	Engine support bolts
	7,000	Brake equal. lever pins
	5,000	Rear spr. shackle bars
	15,000	Brake equal. lever pins
Michigan Screw Co., Lansing, Mich.	7,000	Spring shackle pins 7414-V
	7,000	Rear spr. frt. brack. pins
	7,000	Engine support bolts
Columbia Axle Co., Cleveland.....	6,000	Rear spr. shackle bars
Standard Parts Co., Cleveland.....	5,500	Sets rear spr. shack. sub.-assem.
National Machine Products Co., Detroit	5,500	Sets rear spr. shack. sub.-assem.
E. A. Laboratories, Inc., New York..	12,000	Warning signals
General Mtrs. Corp., Flint.....	5,500	Transm. frt. hangers
Standard Parts Co., Cleveland	5,500	Transm. frt. hangers
General Mtrs. Corp., Flint.....	11,000	Spr. shac. forgings
Standard Parts Co., Cleveland.....	11,000	Spr. shac. forgings
General Mtrs. Corp., Flint.....	5,500	Engine supports
Standard Parts Co., Cleveland.....	5,500	Engine supports
Massnick Mfg. Co., Detroit.....	6,000	Steering gear frame brackets
	6,000	Steering gear frame brack. caps
	6,000	Intermed. brake shaft brack.
Standard Parts Co., Cleveland.....	5,000	Intermed. brake shaft brack.
National Machine Products Co., Detroit.	5,000	Steering gear frame brackets
	5,000	Steering gear frame brack. caps
Union Forging Co., Union, N. Y.....	40,000	Minor parts
Sterling Mtr. Truck Co., Milwaukee.	103,000	Minor parts
	24,000	Minor parts
Indiana Mtr. Truck Co., Marion, Ind..	147,000	Minor parts
Gramm-Bernstein Mtr. Truck Co. Lima.	257,000	Minor parts
Cleveland Hardware Co., Cleveland..	82,000	Minor parts
Standard Parts Co., Cleveland.....	520,000	Minor parts
Stewart Iron Works, Cincinnati.....	110,000	Minor parts
Gramm-Bernstein Mtr. Truck Co., Lima, Ohio	5	Complete assem. minor parts
	515	Minor parts
Empire Brass Mfg. Co., Cleveland....	6,000	Gas reserve tank drain cocks
Metal Forming Corp., Elkhart, Ind..	5,000	Exhaust pipes
Standard Brass Wks., Detroit, Mich	5,000	Gas reserve tank drain cocks
	11,000	Radiator drain cocks
Cook Spring Co., New York, N. Y....	11,000	Springs, brass wire
Burton Lowery Co., Detroit.....	4,000	Sets upholstery
J. C. Wilson Co., Detroit.....	3,000	Sets upholstery
Briggs Mfg. Co., Detroit.....	2,000	Sets upholstery
American Auto Trimming Co., Detroit.	2,000	Sets upholstery
Walker Mfg. Co., Racine, Wis.....	4,000	Sets jacks
Keeler Brass Co., Grand Rapids, Mich	500	Sets brass hood fast.
	4,500	Sets hood fast., mall iron
Columbus Auto Parts Co., Grand Rapids.	3,000	Sets hood fast., steel
Hancock Mfg. Co., Charlotte, Mich...	3,000	Sets hood fast., steel
Hughes & Curren Co., Rochester.....	3,000	Cape tops
Briggs Mfg. Co., Detroit.....	3,000	Cape tops
Anchor Top & Body Co., Cincinnati..	3,000	Cape tops
American Auto Trimming Co., Detroit.	3,000	Cape tops
Gramm-Bernstein Mtr. Truck Co., Lima.	250	Sets spark and throt control assem.
Standard Parts Co., Cleveland.....	5,000	Sets spark and throt control assem.
National Machine Products Co., Detroit.	6,000	Sets spark and throt control assem.
American Brass & Iron Co., Detroit..	6,000	Gas. feed pipe shut-off cocks
Standard Brass Works, Detroit.....	5,000	Gas. feed pipe shut-off cocks
Packard Electric Co., Warren, Ohio..	4,500	Sets wiring assem.
Remy Electric Division United Mtrs. Corp., Anderson, Ind.....	4,500	Sets wiring assem.
Barcy Nicholson Co., Detroit.....	2,000	Sets wiring assem.
Dover Stamping & Mfg. Co., Cambridge.	11,000	Funnels
Gray & Davis, Inc., Boston.....	11,000	Light bulbs, cases
National Can Co., Detroit.....	10,000	Water cans
Chicago Raw Hide Mfg. Co., Chicago.	10,000	Fan belts
Graton & Knight Mfg. Co., Worcester, Mass.	10,000	Fan belts
Crowe Name Plate & Engraving Co., Philadelphia.	10,500	Name plates
Champion Ignition Co., Flint.....	100,000	Spark plugs
Vicheck Tool Co., Cleveland, Ohio.	11,000	Sets tool bag equip.
	11,000	Wrenches, brake adj
	3,000	Wrenches, worm
	6,000	Wrenches tappet
	3,000	Valve lifters
	3,000	Wrenches, spr. clip, open end, 1 in.
	3,000	Wrenches, spr. clip, open end, ¾ in.
	3,000	Handles, pipe, galv., 16 in. long
	3,000	Gauges, valve tappet, etc.
Standard Parts Co., Cleveland, Ohio.	6,000	Gas. feed pipe, sub-assemblies
Imperial Brass Co., Chicago, Ill.....	5,000	Gas. feed pipe, sub-assemblies
Cook Spring Co., New York, N. Y...	11,000	Radiator foot bolt springs
	11,000	Brake rod springs
	11,000	Start. crank catch brack. springs

IN an interview given to a representative of the *Petit Parisien*, M. D'Aubigny, Deputy President of the Inter-Ministry Civil Aeronautic Commission, stated that the project for the establishment of a postal air line between France and Great Britain was approaching realization. He considers that it would be of great usefulness, as it would enable the members of the Inter-Allied Committee at Versailles to communicate rapidly with the British Government. The plan was originally conceived some time ago and M. Flandin was entrusted with a mission to the British Government to consult with the Air Board concerning it.

Pennsylvania's War Road Example

Snow Removal Reduces Annual Maintenance

By R. H. Johnston*



Trains of motor trucks carrying an additional truck, from factory to dealer, are met on Pennsylvania's war road

THE deficiencies of our principal systems of highways from the all-the-year-round point of view have been forcibly impressed upon me as the result of two tours of exploration I recently made with the object of determining the feasibility of driving new cars and trucks from the automobile factories of the Middle West to the Atlantic seaboard. When I say feasibility I do not mean only the possibility of driving cars and trucks through to their destination. I mean the possibility of bringing them through without subjecting them to an abnormal wear and tear prior to their delivery into the hands of purchasers. After examining the Mohawk Valley route, by way of Albany and Utica, and also the Lincoln Highway route by way of Philadelphia and Pittsburgh I must report that over neither route is it possible, at present, to bring through cars and trucks without subjecting them to greater wear than the purchaser could reasonably expect. In the case of Government trucks, I know from actual observation that almost all of these trucks which have been driven through are in need of a certain amount of overhauling before they are in a proper condition to send "over there."

With the Mohawk Valley route the obstacles are snow and ice. The State of New York, which has been so active in all the other items of the war program, has fallen down completely in the very essential one of keeping its main highways free of snow. Nothing whatever has been done by the State government in this respect. For example, the main road between Schenectady and Amsterdam has been completely blocked by ice and snow for months, and the Government trucks which have been laboriously driven to New York from Buffalo have come through only by making a detour which has involved a precarious drive on the Erie canal towpath. One day of hardship spent in the Mohawk Valley was sufficient to convince me that this route is out of the question and will be for some time to come.

Over the Lincoln Highway route, through Pennsylvania, the difficulty is another kind. The State of Pennsylvania has kept the highway open practically all winter by using snowplows attached to motor trucks. In fact, of this route from Cleveland to New York it may be said that 90 per cent is excellent, and 7 per cent is good to fair. But the remaining 3 per cent is almost impassable, and that is about the same as saying that the Lincoln Highway, as a whole, is almost impassable.

The neglect of an 18-mile stretch of road between Beaver Falls, Pa., and New Springfield, Ohio, has practically shut off, for the time being, motor travel between the Middle West and the Atlantic seaboard over this important route. Of course, it is possible to get through this bad stretch of road, as is being demonstrated every day, but no car or truck can come through it and be in proper condition to deliver to a customer without considerable work being necessary. When we traveled over this route from New York last week, we were fully advised in Pittsburgh of the condition of this road and, accordingly, when we came to the beginning of this bad stretch, we left our car and walked ahead through the fields to inspect the road.

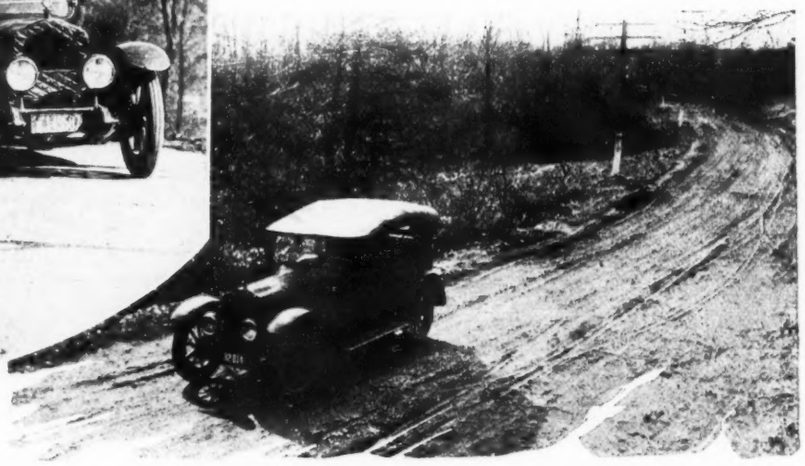
We found the road strewn with license plates, engine pans, tail lights, running-board fixtures and other equipment, proving only too plainly that all the cars had been running aground and that neither high power nor skillful driving was of any avail. I never saw a main road in such bad condition, and I am president of the "Mudlarks," the organization composed of those who went through the memorable New York-to-Pittsburgh endurance run in 1903. The reason the road is so much worse than the ordinary bog road is that the passage over the road of heavy Government trucks—some with 40 hp. engines, and some with four horsepower—has cut great ruts, and the weight of the trucks has pushed down into the mud all the broken stone and other solid road material. Some of the drivers, who had succeeded in coming through, estimated that there were 200 cars stuck in the mud and practically at a standstill, and others estimated the number as high as 500.

All the possible detours have been tried, and those who have tried them tell the same kind of stories as those who kept on the main road—stories of sleeping all night in cars and in farmhouses, stories of tire chains lasting only a few miles, stories of farmers with teams getting rich quick, stories of mud and cold and despair. In fact, the only method which has proved effective for getting around this bad stretch of road is that adopted by the Quartermaster's Department.

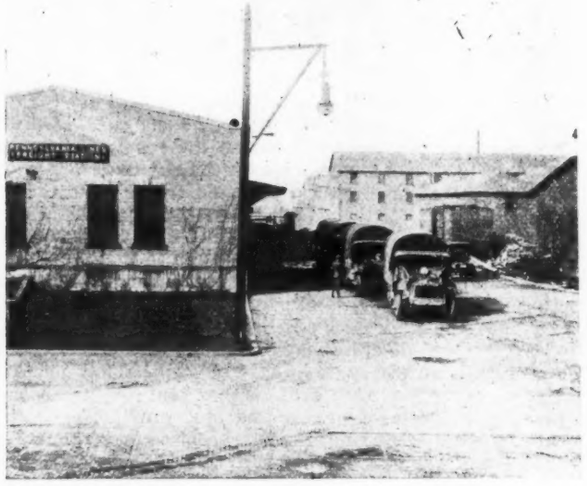
(*Continued on page* 618)

**Editor's Note.—R. H. Johnston, manager of the New York branch of the White Co., has recently driven over the highway from New York to Pittsburgh and over the New York-Buffalo route to Amsterdam, for the purpose of investigating snow conditions on these highways and the effect of snow removal from them. Mr. Johnston is well qualified to criticise modern road conditions, as he is a pioneer tourist and president of the Mudlark organization, a group of those motorists who participated in the New York-Pittsburgh endurance run of* 1903. *Mr. Johnston was for many years a contributor to the* AUTOMOBILE *under the nom de plume of Pathfinder.*

Scenes Along Pennsylvania's

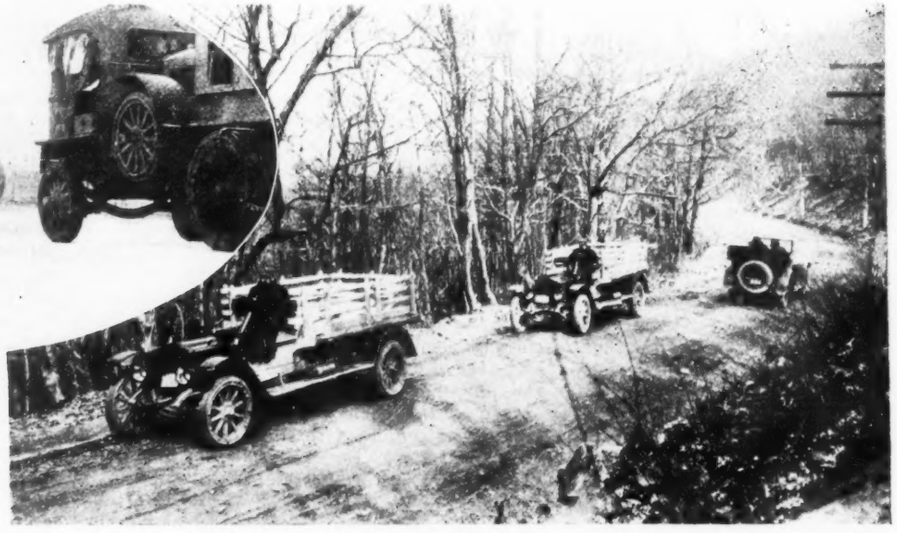


Above—Culverts keep the water off the road. Right—Road to McConnellsburg through the Alleghenies



To avoid the almost impassable stretch of road beyond Beaver Falls (shown at the left) the Government loaded its war trucks on flat cars and shipped them over the railroad

Garford motor truck train on its way to the seaboard, showing each motor truck carrying a complete chassis



Trains of White trucks are encountered along the West-East Highway en route to Atlantic ports

Well-Kept Highway System

A sample of good Pennsylvania highway on the road to Bedford, showing recent work done on road

One of the Pennsylvania State Highway Department good road trucks, which kept the war road in good condition all winter

Good roads material is obtainable right alongside the road from one of the quarries. On the right is shown one of the many road patrolmen fixing up a bad piece of road on the way to St. Thomas

Hairpin turn on the road to Fort Loudon. This is right in the heart of the Allegheny Mountains and shows a good sample of fine road work. Right—Pennsylvania State Constabulary patrols the highways of the State

Rural Express Possibilities

Maryland Has Twenty-Two Routes—Exclusive Franchises Granted—Department of Agriculture and Food Administration Investigate Possibilities

BALTIMORE, MD., March 20—The map on this page and the illustrations on the following page give impressions of the working of rural express systems radiating from this city and also from Washington. All told there are twenty-two different rural express routes in this area and thirty trucks are employed on these routes. The road mileage embraced on the schedules approximates 1574 miles.

In Maryland exclusive licenses are being given for the operation of rural express systems over certain routes on assurance from the applicant and truck operator that he will maintain a schedule agreed upon and further agree to provide truck capacity to take care of all the express matter offered to the system. If the applicant for the franchise cannot meet these conditions the exclusive license is withdrawn in that competing companies are given franchises over the same routes. Much criticism has been offered on this exclusive franchise basis on the ground that it may possibly be used for political purposes, which would eventually react on the development of the system. Maryland is certain to be watched closely and perhaps used as an example by other states in this rural express service.

For some unknown reason the system has developed more in this zone than in others. One explanation of this may be that there are 75,000 to 100,000 more people living in Washington, D. C., than a year ago, and yet there has not been any increase in railroad tracks to serve this influx of population. The rural express is serving to good ends in this way.

Baltimore has gained unexpected importance because of war shipping, and the fact that Newport News has not good enough highways to make it available for motor truck traffic. Baltimore has profited as a direct result of this.

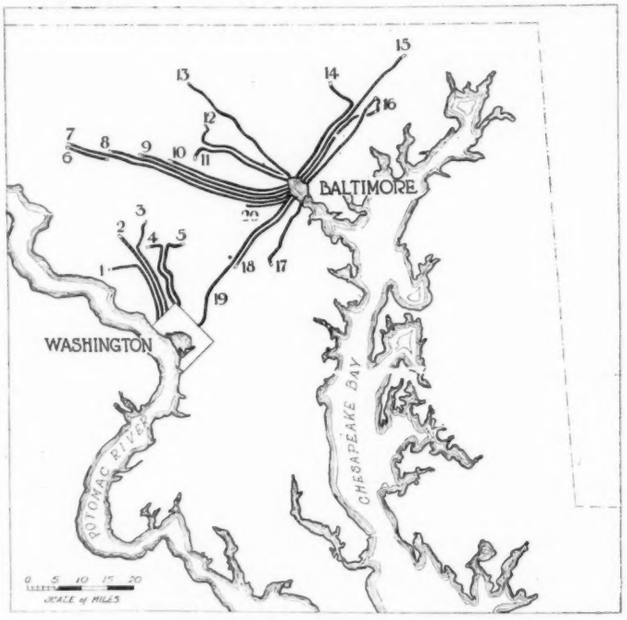
The possibilities of rural express are unlimited and it largely depends on the extension of the service and the adherence to schedule. Already the service has shown what a conserver of man power on the farm it can be. The Department of Agriculture has become interested in it as a means of getting products from the farm to the city which is normally allowed to waste on the farm. It has approximately thirty-seven investigators studying the system with the thought of applying it in many other parts of the country. The Maryland system has demonstrated how it is possible to develop a business between remote farming sections and such cities as Baltimore and Washington. Farm produce and supplies are reaching these cities in a few hours, which formerly required several days, and due to which delay the volume shipped from the farms was very small compared with that handled by the express companies.

The Food Administration has already realized the value of the rural express as a means of increasing the volume of food, and also reducing the cost. It also has investigators studying the system, doubtless with the thought of urging its more general application.

As a conserver of man power the rural express has many advantages. It makes it possible for the farmer to market his food products without his having to leave the farm and neglect farm duties. There is approximately a 10 per cent shortage of help on the farms in the Baltimore and Washington zone and it is possible to an extent to compensate for this shortage of help by the rural express. It has been stated that one truck operator on a rural express system is bringing to Washington produce which was formerly brought by forty farmers. In this way man power on the farm is being conserved at approximately a 40 to 1 ratio. The rural express is also being used to carry merchandise from the city to the farm and is thus working on a return-load basis.

In northern Ohio good progress is being made and already a great many routes have been mapped out. Alert motor truck salesmen have seized the opportunity of advancing truck sales by showing the possibilities of the rural express system.

The great amount of time that is saved by rural express by motor truck as compared with horse delivery is well brought out by one example. Whereas the speed of horse-drawn wagons is but 2 m.p.h., average, trucks of light capacity, such as are used in this service, travel an average of 16 m.p.h. In other words, the truck is eight times as fast as the horse. This means, of course, that a corresponding increase in the amount of merchandise moved is effected, or that the utility of the service is proportionately increased.



Rural Express Development in Maryland

No.	From	To	Miles	Trucks	Cap.*	Mileage
1	Washington	Travilah	18	1	2	36
2	"	Germantown	25	3	7.3	150
3	"	Latonsville	20	1	2	40
4	"	Redland	15	1	1.5	30
5	"	Ashton	15	1	1	30
6	Fredericksburg	New Mart	8	1	0.5	16
7	Baltimore	Fredericksburg	47	2	3	188
8	"	New Mart	39	1	0.8	74
9	"	Mount Airy	33	1	3.5	66
10	"	Lisbon	28	1	3	56
11	"	Gamber	23	1	1.5	46
12	"	Sykesville	23	2	8	92
13	"	Westminster	30	1	3.5	60
14	"	Taylor	30	1	3	60
15	"	Dublin	35	1	4	70
16	"	Emerton	22	1	3.5	44
17	"	Camp Mead	18	1	2	36
18	"	Laurel	20	1	4	40
19	"	Washington	40	4	13	320
20	"	Ellicott	10	2	3	40
21	Hagerstown	Hancock	28	1	2	56
22	Cumberland	Flintstone	12	1	1.3	24
	Total			30	73.4	1,574

*Capacity in tons.

Rural Delivery Routes Will Join Farmer and Market

Five horses drawing baled hay—One truck eliminated five horses from this farm. One man hauls for many farms. He has some 36 acres additional sown in wheat and corn which previously produced oats and pastured his horses

Accumulated loads—Eight gallons being transferred to milk truck; four to six hundred gallons travel rapidly to market 20 to 50 miles away. The wagon travels one-quarter of a mile back to the farm over mud road

More food made available for use—Three-gallon can of cream is $3.90 gain per day for the farmer. It will be delivered to city creamery 20 miles away in 1 hr. and 30 min. at a cost of 10 cents. A colored lad has just come down the lane from his barn 400 yd. away. In no other manner could this cream be made available at the market or the extra profit gained by the farmer

The farmer places tags on his calves and ties them in front of the house by the roadside. When the rural express truck comes along it takes the calf to market

In addition to corn being loaded into the truck there are two calves billed to market 22 miles away by Barnsley's Express — a greater profit to the farmer because of modern marketing facilities

AUTOMOTIVE INDUSTRIES
AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1918 by the Class Journal Co.

Vol. XXXVIII Thursday, March 21, 1918 No. 12

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
231-241 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
A. Ludlow Clayden P. M. Heldt
Sydney Oxberry

DETROIT OFFICE
J. Edward Schipper Allen Sinsheimer

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland— Guardian Bldg., Phone Main 1142.

Cable Address - Autoland, New York
Long Distance Telephone - 8760 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico - One Year, $3.00
Canada - One Year, 5.00
Foreign Countries - One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 243 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of the Audit Bureau of Circulations.

Automotive Industries-The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Liberty Loan Drive

EVERY industrial organization, factory and business institution should organize a Liberty loan drive. The drive is simply a matter of salesmanship and planning from beginning to end, and hence should be handled in the same manner as a sales campaign.

In other parts of this issue directions are given which can readily be applied to any factory or business organization. The executives should not miss this opportunity to serve the government, and should immediately set to work to plan such a campaign. It is necessary to start at once if it is to be made a success, as there are a number of details in connection with such a plan that require time and thought.

Let not the idea that the matter might interfere with the regular work stop any one from organizing such a drive in his plant. The interruptions will be made up many times over by the fact that you are helping in the most potent cause which confronts us to-day. The government must have money to win this war. The Liberty loans are the only means to get it and the factories and business houses are the best medium through which to address large numbers of people collectively. Furthermore, the work will serve to engender an *esprit de corps*, a sense of participation in team work, which will fully repay the company for any loss of time.

The next drive is the most important one we have to date. The eyes of the world are on this country, and we must show our determination to win. There is no way of expressing our determination so strongly as by our willing sacrifices. Furthermore, we are not urged to give but to lend in these campaigns, and for that reason, while helping the government is the chief consideration, at the same time a habit of saving may be developed in our country whose people frequently have been accused of lack of thrift.

The U. S. A. Motorcycle

THE advantage of a single design machine for war operations, chiefly due to the simplification of the spares problem, led the Quartermaster Corps to the decision to have a special motorcycle designed for army use. The machine which has been produced (the engine of which is fully described in the leading article in this issue) does not differ materially from current stock models of the heavier type, but is probably the most advanced design ever evolved. It is essentially a side-car type, being provided with the necessary lugs for side-car attachment, and powered sufficiently to make it possible to negotiate all road conditions with the side car in place. Moderate compression is used, giving an engine which can pull hard at relatively low speed.

Protection of the working parts from dust evidently has been a problem uppermost in the minds of the engineers who worked out the design. Not only are the inlet and exhaust valve springs fully enclosed, but a special pressed steel cover has been developed for the inlet valve tappet lever, which does not interfere with oiling of the pivot bearing of this lever. To keep dust out of the engine a dust separator or air cleaner will probably be used. This may possibly somewhat reduce the engine power, but the damage done by dust getting into the engine when motorcycles are being driven in squadron formation over dusty roads is believed to be so serious that this slight sacrifice seems justified.

Sturdiness is a characteristic of the U. S. A. cycle engine and will also characterize the complete motorcycle. This is a highly desirable quality in a machine for use on the shell-torn roads of France and Flanders. The severity of the service at the front is indicated by a rumor current here last winter to the effect that one of the allied nations then had a junk pile of 70,000 motorcycles, and was considering the best means of salvaging part of this material. Even now American motorcycles of the heavier type have established for themselves a reputation of unequalled reliability at the front, and the prospects are that when the new olive drab-painted U. S. A. motorcycles arrive on the scene next fall they will give an even better account of themselves. There will be no skimping of expense for material and labor, as shown by the fact that there are no less than five annular ball bearings in the rear wheel alone.

Airplane Production

THE three airplane investigations now under way will accomplish much good if they succeed in informing the public of many of the unexpected problems that have had to be met and overcome in the development to date of the Liberty engine. The public is quite unfamiliar with the program of carrying a design such as this engine through the various steps up to production, and the difficulties to be overcome in the design of the Liberty engine were especially great because there was no aircraft engine industry in existence in this country at the time the program was decided upon.

That the production program is behind schedule is a matter of regret. There have been troubles with the Liberty aviation engine. There have been differences of opinion with regard to certain features of design right from the inception of it, but such differences of engineering opinion are bound to arise. In the development of this engine it was impossible to ride rough shod over all of the opposition. The alterations in the lubrication system of the engine to the complete force feed system might be cited as an example in point. Some of the engineers realized last June that force feed was better—in fact, essential—but the sum total of engineering knowledge to-day is greater because of some of these errors which were made to maintain co-operation in engineering circles than if such co-operation had been cut off last June. The Liberty engine of to-day is a better engine because of these problems.

These investigations, we hope, will expose to public gaze much of the pernicious pro-German activity that has been directed against this engine. Not enough publicity was given to the machinery for some of the airplane factories that arrived in ruined condition. Not enough has been said about special materials for the engines that have not been up to specifications, although there seems not the slightest reason for such delay. Too great a veil of secrecy has surrounded the engine, although this has generally been justified in that the engine occupies an entirely different field from that of almost any other piece of automotive apparatus. The airplane, serving as the eyes of the army, possesses much greater potential possibilities of destruction, directly or indirectly, than can be incorporated in a motor truck, a tank, or motor apparatus for moving artillery or other weapons of aggression or defense. It is unique in this respect, and as such greater secrecy must surround it than the other war apparatus cited.

Unfortunately, not a few of the messages that have gotten to the public have not been the most desirable, and others that should have been given circulation have not. There is no use denying the fact that some changes have been made. The engine has so much good in it that its case to-day, and the work of the Aircraft Board, would be much stronger had some of these difficulties been given a measure of circulation.

To-day it is not so much the performance of the engine but rather its speed of production that is up for investigation. The general public is not able to conceive of the amount of work necessary from the time the first design is completed until the factories are tooled up and jigged up to go into quantity production. This is an unknown story to the average mind. It is a story the meaning of which will not be fully conveyed by one telling. To put an engine of these cylinder dimensions into quantity production is a herculean task. The production of the jigs and tools alone is a big task. The time necessary becomes much greater when factories have to be built and machinery installed as well.

Co-operation Is Needed

AT a time when co-operation so far as representing the automobile industry in Washington is needed perhaps as much as at any time in these critical days the N. A. C. C. has decided not to work in the same committee with the M. & A. M. A. The dissolution of the Automobile Industries Committee by the action of the N. A. C. C. in withdrawing from it seems like a step in the wrong direction and more of a slap at co-operation than a boost for it. These are days for increased co-ordination of effort rather than reduced co-ordination.

Why should not all of the so-called automotive industries have a common representation in Washington? Such industries as automobile, motor truck, farm tractor, airplane and motorcycle have many interests in common. This is particularly true of the automobile, the truck and the farm tractor. Instead of each of these having a separate representation they should have certain joint representations. The question of fuel is common to them all. The problems of materials are much the same in all three. The same applies to railroad transportation. It is unity of effort and representation among kindred industries that should produce that war efficiency which is needed.

While co-operating together in the Automobile Industries Committee much good was accomplished and the very necessary point of contact between the industry and government department was established last November when the chrome situation was so acute. The necessary point of contact was provided through the committee during January when the coal situation was acute. The necessary point of contact was provided when the conversion work was going on. Other acute situations are bound to arise and it is difficult to see why two offices, two organizations and two avenues of approach are necessary and it is questionable if they will prove as strong as one united, harmonious presentation. These are not days for petty jealousies as to which organization is the dog and which the tail, but rather days for the strong co-operation for the general good.

□ Latest News of the

Committee Named to Fix Prices

To Investigate Costs of Basic Raw Materials and Recommend New Figures

WASHINGTON, March 20—A Price-fixing Committee has been appointed under the authority of the War Industries Board and will pass upon prices of basic raw materials and from time to time establish price-fixing policies for the approval of the President. The committee consists of Robert S. Brookings, Brigadier-General Palmer E. Pierce, Paymaster John Hancock of the Bureau of Supplies and Accounts of the Navy, Dr. H. A. Garfield, F. W. Taussig, chairman of the U. S. Tariff Commission, W. J. Harris, chairman of the Federal Trade Commission, Hugh Frayne of the War Industries Board, and Bernard M. Baruch. A civilian member will be appointed later.

The object of the price-fixing committee is two-fold. First, it will be a separate body, quasi-judicial in nature, for the purpose implied in its name and it will serve this purpose through being made up of men separated so completely from industrial interests that their motives and actions in the determination of prices can be subject to no suspicion of mercenary interest. Prices will not be made until after costs have been passed upon by the Federal Trade Commission. With costs as a basis, the price-fixing committee will then consider problems of production and distribution before arriving at its decisions. The second object to be achieved by the committee is speed. The committee will sit all the time and will thus eliminate unnecessary delay caused by the consideration of price-fixing problems in several different quarters.

—

Truck Brings Produce From Farm to Consumer

NEW YORK CITY, March 20—The possibility of delivering produce direct from the farm to the consumer in the city by motor truck was demonstrated yesterday when a motor truck made the trip of 180 miles from Lancaster, Pa., to New York City carrying 1000 small chickens, fifty crates of eggs, and 200 lb. of honey. The truck left at 4.25 a. m., and reaching New York City at 5 p. m., delivered the produce direct to the New York merchant.

The trip was made by John I. Blakeslee, Fourth Assistant Postmaster General, who has charge of parcel post delivery work. Mr. Blakeslee is an ardent believer in the use of motor trucks for rural parcel post delivery work and believes the high cost of living and the scarcity of help on the farm can be materially remedied by long distance service of this nature, bringing the food products from the farms direct to the centers of population without the necessity for frequent handling.

The truck will leave New York City to-day for Lancaster loaded with parcel post packages from New York to that city. The total postage charges on the truck load arriving yesterday was $31.61 and it is estimated that $10 represents the cost of the trip.

—

Ordnance Department Not to Control Truck Transportation

WASHINGTON, D. C., March 20—It may be authoritatively stated that recent plans held by the War Department to place all motor transportation of the army under the Ordnance Department have been cancelled. It now seems as if the motor truck activities will either be placed under a new division directly under the General Staff or will remain in the Quartermaster Corps, which will in that event control all of the motor transport activities of the army.

—

Stromberg Earns $318,819

CHICAGO, March 20—The Stromberg Motor Devices Co. earned net profits of $318,819 for 1917, before the deduction of war taxes. This is equal to $6.37 a share on the 50,000 shares of outstanding stock, as compared with $5.56 in 1916. Net sales totaled $1,644,947 as compared with $1,208,443 in 1916, making the net profit on sales 21 per cent as against 23 per cent the year before. The net income account of the company for 1917 follows:

Net sales	$1,644,947
Mfg. cost	1,173,890
Gross profit on sales	471,056
Administrative and general expenses	235,917
Balance	235,138
Other income	335,330
	$570,562
Loss on investments and bad accounts	16,511
Profit for year	$318,819

—

Kerosene Carburetor Company Is Reorganized

DETROIT, March 21—The Kerosene Equipment Co. is being organized with $50,000 to take over the Detroit Kerosene Carburetor Co. A factory will be built for the manufacture of kerosene carbureters. E. E. Schwarzkopf, president of the Detroit company, has been elected president and treasurer of the new corporation. J. W. Racklyes is vice-president.

Enlarge Washington M. A. M. A. Office

To Be Distinct from N. A. C. C. Which Also Will be Greatly Enlarged

WASHINGTON, March 20—Following the separation of the N. A. C. C. and M. A. M. A. the Motor and Accessory Manufacturers Association will occupy offices in the Ouray Building, 8th and G Streets, where it will have a considerably enlarged personnel. The National Automobile Chamber of Commerce will take over the offices previously held by the Automobile Industries Committee in the 2nd National Bank Bldg. The N. A. C. C. will have the following engineers in its organization here: C. C. Halliday, of the Lewis Spring & Axle Co.; F. H. Kane, Oakland Motor Car Co.; H. T. Woolson, Studebaker Corp.; G. L. Bixby, Anderson Electric Car Co., and C. W. Neff, of the Buick Motor Co. The men will operate under the direction of Hugh Chalmers.

—

Class "B" Convoy En Route

NEW YORK CITY, March 20—The first convoy of thirty-three of the Class B standardized war trucks started from Ohio on the trip to an Atlantic seaboard. These trucks are following the route over which the Detroit truck convoys have been traveling, and which has been kept cleared of snow through Ohio, Pennsylvania and Maryland during the past winter.

—

Withhold "A" and "AA" Contracts

WASHINGTON, D. C., March 20—Letting of contracts for the Class A and Class AA standardized trucks is temporarily withheld. The contracts will not be let until it is definitely ascertained which department and individuals will control the future of these trucks.

—

Liberty Engine in First Service

WASHINGTON, March 21—A navy flying boat equipped with a Liberty engine flew from the naval air station at Hampton Roads, Va., to the capital yesterday, covering 180 miles in 2 hours. There were a pilot and two passengers aboard, and no trouble with the engine was experienced during the trip. The return journey will be made in a few days. Secretary Daniels and other navy officials are highly satisfied with the performance of the engine, and further long-distance tests will probably be made within a few days.

Automotive Industries

Steel Trade Denies Any Shortage

Rumors of Lack of Chrome Suggest Further Curtailment —Labor is Plentiful

WASHINGTON, March 20—Washington has heard many rumors in the last week that Government officials are considering a further curtailment in the automobile industry due to an alleged shortage of steel. Again it is the chrome situation that is advanced as the reason for any further curtailments. The steel shortage is denied by the steel industry itself. It is stated here that the real reason for the curtailment by the steel shortage route is need for skilled labor of the automobile industry. Several members of the Council of National Defense admit this and have gone so far as to say the automobile industry should be curtailed another 50 per cent to provide sufficient workers for the shipyards—which is additional proof that official Washington works in circles and that one department is not all conversant with the facilities of another department. As a matter of fact there is no labor shortage in the United States anywhere that is serious. There is no shortage of shipyard workers. There is no shortage of munitions workers. There is no shortage of farm labor.

It is these three that comprise the important branches of our industrial and agricultural existence and which must have labor to insure military victory. In the New England states which are hustling and alive with industrial work of every kind including munitions manufacture and shipbuilding, and which states are regarded as an industrial barometer by the Department of Labor, there is no shortage of skilled labor and there is even a surplus in some localities.

Last week shipbuilders testified in Washington before the Wage Fixing Commission but there was no shortage of labor. This week the United States Employment Service of the Department of Labor notified all shipyards that through its usual employment channels and through its U. S. Public Reserve which has enrolled 225,000 shipyards workers, that it is now prepared to fill all their labor needs, and requests shipbuilders to obtain their workers exclusively through this service. Compliance by the shipyards with this request will eliminate labor shortage hysteria, will prevent unnecessary and permature withdrawal of workers from other industries, will abolish "stealing" of men by one yard from another, and will prohibit a piling of idle labor in the shipbuilding centers.

Insofar as munitions plants are concerned the U. S. Employment Service is ready and capable here too to provide all of the workers necessary. For example, a large munitions manufacturer in Detroit yesterday telegraphed the Department of Labor that he was in urgent need of a number of men. The Department of Labor instructed its employment service of the request and asked it to secure the labor through its usual channels adding that if this did not suffice it should draw on the Public Service Reserve branch at Detroit. This morning it was reported that the order had been filled satisfactorily. The Department of Labor now operates a weekly report system which gives an excellent indication of labor conditions. In the past week for instance, reports show that twenty-seven industrial centers east of the Mississippi felt a normal shortage of labor proportionate to the present industrial activities while eighteen centers showed no shortage or surplus and fourteen centers reported large surpluses. On the west side of the Mississippi this report is reversed and the majority of industrial centers have a large surplus of labor which displays that there is no labor shortage but there is a labor distribution problem.

The Department of Labor estimates that there will be a large demand for farm workers when the season opens. It plans to meet this demand by means of a special farm service division which will have special field agents, posters announcing federal farm labor co-operation, 55,000 post office operating as labor agencies, weekly bulletins listing opportunities for farm employment, weekly reports of farm labor conditions, co-operation of 2300 Department of Agriculture county agents, and enrollment of labor through the Public Service Reserve. In addition newspapers and other publications will open farm bureaus where men seeking farm work can register and Boards of Trade and Chambers of Commerce will operate as employment agencies. During the harvest season in the central western states temporary offices will be open in many cities to furnish accurate information as to where harvest hands are needed. A campaign is now starting to enroll 250,000 boys under 21 years in the Boys Working Reserve for farm work and another campaign will shortly begin to enroll not less than 250,000 farm workers in the U. S. Public Service Reserve. The Department of Labor states that its study has convinced it that while there will soon be a severe shortage of farm labor, there is sufficient available labor to meet the demands of agriculture and it is confident that the agencies which have been conceived and placed in operation will with co-operation meet every demand.

Pool Truck Activities of Army

Conflicting Reports Place Control of Standardized Vehicles Under Three Heads

WASHINGTON, March 20—The past week has been exceedingly active as regards matters automotive. Standardized trucks, airplane production, standardized motorcycles, and labor entered into the events of chief importance. The pooling of all motor truck activities for our army now seems to have entered into another stage. Within the last few days there have been rumors that all the motor truck activities would be pooled under the Ordnance Corps and under direction of Colonel Moody. To-day reports are current that the General Staff has decided on a new course by whcih it will pool all of the motor truck activities of the army under a civilian who will be directly responsible to the General Staff. So that now we have three reports, one that the Quartermaster Corps will control the trucks, another that the Ordnance Department will direct them, and a third that these activities will come directly under the General Staff. It is difficult to predict just which will be decided upon.

News of the completion of design and first sample engines of the new standardized Liberty motorcycle has been received with considerable interest. There have been many rumors of dissension between some of the motorcycle manufacturers on this plan which are now shown to have been false by the complete harmony with which they devoted their energies to completing this engine.

—

Separate War Industries Board?

WASHINGTON, March 20—The Council of National Defense seems to be gradually coming out of the muddle in which it found itself following the recent Congressional investigations. The appointment of Bernard M. Baruch as Chairman of the War Industries Board has had a stimulating effect. Reports are current that eventually the War Industries Board will separate from the council and become the only purchasing agency for the Government and for the Allies, thus bringing about that centralization of buying which the President advocated months past and which depends upon the passing of the Overman Bill. The Council itself will probably be allowed to exist as a smaller, less-important body. Such a movement would not affect the automotive section other than to increase its importance.

M. & A.M.A. Appreciates Work Done

Copland to Represent the Association in Washington—Will Continue Work Done During Life of Automobile Industries Committee—To Work with Tractor Shows

NEW YORK CITY, March 15—The Motor & Accessory Manufacturers' Assn. is going to continue its active work in Washington by way of assisting the Government in war work and also assisting its members in connection with this work. For these activities Alexander W. Copland, who was chairman of the automobile industries committee until it was dissolved, and who represented the accessory association as chairman of this committee, will continue to represent the 308 members of the association. Mr. Copland will have headquarters in the Ouray Bldg., Washington, and will be the point of contact between the various Government departments and all of the members of the association. He will continue to carry on the work that he was carrying on for these manufacturers during the life of the automobile industries committee.

Representation Continued

The Motor & Accessory Manufacturers' Assn., at its regular monthly meeting held to-day, did about the only thing left for it to do after the National Automobile Chamber of Commerce had withdrawn its representative, Hugh Chalmers, and after the Ford company had withdrawn John R. Lee, its representative, from the automobile industries committee, namely, to continue its Washington representation alone, and leave this work in charge of Mr. Copland, who has proved himself an able point of contact between the industries and the Government since the appointment of the committee last November.

Satisfactory Work Done

In taking this action, the Motor & Accessory Manufacturers' Assn. in a letter to its membership states that it considers that the work done by the automobile industries committee has been very satisfactory and that the spirit of co-operation last November as embodied in the committee was a wise move. The following closing paragraph from a letter to its membership expresses the appreciation of the association:

"Your directors cannot refrain from commending the work of the automobile industries committee, and the loyal, unselfish, patriotic and sacrificing services of the members of that committee, Messrs. Copland, Chalmers and Lee."

The association has also addressed a letter to the National Automobile Chamber of Commerce asking that body to cooperate in a letter of appreciation to the automobile industries committee for what it has done. This letter sets forth the views of the association as follows:

"We believe that the unselfish and loyal work of Messrs. Chalmers, Lee and Copland should at least be rewarded with a vote of thanks, and the directors of the Motor & Accessory Manufacturers' Assn. desire to express to the directors of the National Automobile Chamber of Commerce a willingness to cooperate with them at any time where our mutual interests are concerned.

"We believe the interests of both associations can now best be served by separate representation, although we are confident that the work of the joint committee was wise in the beginning."

A letter was also sent to the Ford Motor Co., extending the appreciation of the association for the work done by Mr. Lee as representative of the Ford company on the automobile industries committee.

The association some time ago appointed an alien labor committee, with Albert Champion as chairman, assisted by W. C. Rand and George Edmonds, which committee is ready to submit plans and suggestions for educational co-operation on the part of all members of the association. This matter is of such importance that the complete plan is to be laid before the membership at the next meeting.

The show committee of the association, under the direction of William E. Sweet, chairman, is investigating the attitude of tractor manufacturers toward the Motor & Accessory Manufacturers' Assn. with a view to assisting in tractor shows just as the association has assisted with automobile shows.

—

Plan Annapolis-Washington Highway

WASHINGTON, March 18—A bill providing for immediate construction of a concrete highway from Annapolis to Washington via Camp Parole, Chesterfield, Buena Vista and Bladensburg has been presented by Senator Mezerott. This road, if completed, will provide the remaining necessary link to connect Washington with the fertile produce regions of eastern Maryland by motor truck.

—

To Call Sub-Chasers "Eagles"

WASHINGTON, March 16—Secretary Daniels decided to-day to name the submarine fighters being manufactured by Henry Ford "Eagles." They will constitute the "Eagle class," and will be styled Eagle No. 1, Eagle No. 2, etc.

—

S. A. E. to Standardize Turnbuckles

DAYTON, OHIO, March 18—A meeting of the Society of Automotive Engineers was held at the Miami Hotel here recently to discuss the standardization of turnbuckles. It was decided that careful and prompt action be taken to adopt a uniform standard as a means of speeding up airplane production. The S. A. E. recently decided on a standard overall dimension for turnbuckles, and later complete standardization was attempted by the International Aircraft Standardization Board. When the Signal Corps endeavored to use these specifications several inconsistencies were found. As a result, the meeting of the S. A. E. was called, and work will start immediately on new standardized specifications.

Among those present at the meeting were: F. W. Caldwell and R. V. Hutchinson, of McCook Field and the Dayton-Wright company; J. V. Costello and J. L. McClelland, of the Signal Corps; F. E. Cardulla, of the Curtiss company; Paul G. Timmerman, of the Engel Aircraft Co.; G. H. Weun, Albert H. Hilton, Jr., and E. E. Russell, of the Dayton Metal Products Co.; A. M. Orr, of the National Airplane Co., and R. D. Oldfield and J. C. Wilkie, of the Western Automatic Machine Co.

—

Lee Tire Sales Increase—Expenses Decrease Profits

CONSHOHOCKEN, PA., March 19—The Lee Tire & Rubber Co. in its report for 1917 shows a large decrease in the balance available for dividends as compared with 1916. In 1917 this balance was $22,589, while in 1916 it was $237,337. Some of this decrease is attributed to extraordinary expenses in acquiring a sales organization and establishing branches in New York, Chicago, Boston, St. Louis, Atlanta, Indianapolis, Milwaukee, Buffalo and Providence.

The net income account and consolidated balance sheet, as of Dec. 31, 1917, compares as follows:

	1917	1916
Net sales	$4,073,895	$3,587,769
Expenses	4,015,308	3,340,863
Oper. profit	$58,587	$246,906
Income from rentals	3,102	4,163
Total profit	$61,689	$251,069
Interest and taxes	39,100	13,722
Balance for dividend	$22,589	$237,337
Dividends	.....	225,000
Surplus	$22,589	$12,337
Previous surplus	16,395	4,058
Total surplus	$38,984	$16,395

	1917	1916
Assets—		
Plant and equipment	$1,346,704	$1,206,229
Patents, etc.	403,300	400,300
Stock Lee Tire Sales Co.	500	500
Deferred charges	27,781	28,541
Cash	155,960	258,560
Accounts receivable	557,714	349,777
Trade acceptances	13,474	.....
Notes receivable	5,842	8,415
Current Account Sales Co.	.....	112,313
Inventories	1,576,730	1,601,442
Working funds at branches	9,142	.....
Total	$4,094,147	$3,966,078
Liabilities—		
Declared capital	$750,000	$750,000
Notes payable	1,025,000	1,000,000
Accounts payable	125,911	75,814
Rent received	500	.....
Res. for deprec., etc.	231,661	191,661
Res. for tire claims	38,500	38,633
Income tax	.....	9,983
Working capital	1,883,591	1,883,591
Surplus	38,984	16,395
Total	$4,094,147	$3,966,078

3 Investigations for Airplanes

Coffin Trying to Run Down Derogatory Rumors—Marshall Working with Super-War Council

WASHINGTON, March 18—Three investigations are under way to discover why the aircraft program is 90 days behind its schedule, as claimed by the Senate Military Affairs Committee.

One is being conducted by Howard E. Coffin, chairman of the aircraft board, who is determined to run down the various reports and rumors; another by H. Snowden Marshall, chairman of the committee appointed by the President, who is working with the super-war council, and a third is being made by Gutzon Borglum, New York sculptor, who has a mysterious part in the situation.

It is reported that President Wilson has already received a secret report from Mr. Borglum regarding the delayed program, which says that Borglum carried a letter from the President to airplane manufacturers and, in fact, to all concerned, to aid him in obtaining complete data.

Mr. Marshall's duties will include the investigation of the whole matter of delayed production. Mr. Coffin is working more specifically to run down reports and rumors of troubles in making the Liberty motors, which are believed in the main to be unfounded.

Mr. Coffin left Washington last Friday to make a complete tour of all the plants, and his report will be checked up later with the two others as well as those of officers of the Signal Corps whose duties include supervision of any mechanical or production irregularities which might develop.

There have been some suggestions of a profiteering ring which had enmeshed the aircraft program, but these rumors are said to be without justification. The Signal Corps and the aircraft board are both emphatic in requests that if there is any suggestion of profiteering it should be disclosed.

The most authentic reports of the Liberty motors are very optimistic. It is said that the Curtiss type of plane in which the engines have been tested are small compared with the immense battle plane now in process of construction. It is also reported that even the motors themselves which have been used for experimental purposes are relatively small, and yet experiments with these motors and planes have had results far in excess of the hopes of experts.

—

Liberty Airplane Arrives in Washington

WASHINGTON, March 19—The Liberty airplane engine which was shipped to Washington arrived yesterday and was tried out in a Curtiss plane under the direction of Major A. J. Smith. It is expected that many flights and tests will be made next week. Apparently there is going to be some competitive testing. Colonel Chas. F. Lee, using an Avon machine, is here, and Lieutenant Georges Flaschaire of France is en route to Washington with a high-powered French machine.

—

Women Working on Liberty Engines

WASHINGTON, March 19—Employment of women machinists in the factories producing Liberty airplane engines is proving satisfactory, according to the Aircraft Production Board. At present several hundred women are working on lathes, drill presses and other machines for converting rough castings into finished parts.

—

No More Civilian Airplane Instructors

WASHINGTON, March 18—The War Department has made a new ruling that civilian instructors will no longer be used in aviation schools and only commanding officers will do the instructing.

—

Form Chicago Aviation Club

CHICAGO, March 16—The Aero Club of Chicago, a new aviation association, was formed here last week. It is composed chiefly of former members of the Aero Club of Illinois, which is inactive at present. Its headquarters have not been announced yet. Officers are: President, James A. Zanug; first vice-president, Wallace B. Blood; secretary, Ralph Fulher, and treasurer, Heber Jorgenson.

—

Hale & Kilburn Surplus $159,961

PHILADELPHIA, March 18—The first annual report of the Hale & Kilburn Corp., successor to Hale & Kilburn Co., shows total assets of $7,374,739 and current liabilities of $1,832,512. The surplus was $159,961, as compared with $24,614 in 1916 and $1,569 in 1915. The consolidated balance sheet follows:

Assets

Plant and equipment	$12,188,331
Capital stock of Central Realty Corp.	400,000
Miscellaneous investment	10,951
Patents and good will	2,500,000
Cash	95,289
Receivables	1,167,307
Inventories of raw materials, work in process etc.	1,016,850
Total assets	$7,374,739

Liabilities

Preferred stock	$2,282,266
Common stock	1,750,000
Serial 5- to 15-year notes	750,000
Accounts payable	567,512
Notes payable	825,000
Ground rent	50,000
Miscellaneous reserve	390,000
Surplus	159,961
Total liabilities and surplus	$7,374,739

A. J. Brosseau, H. J. Fuller, Arthur Lea, Charlton Yarnall and George Foster will succeed O. H. Culter, S. M. Curwen, Thomas Newhall, A. M. Kittredge, H. W. Davis and H. D. Gibson. There is still a vacancy on the board, and Alba B. Johnson, voting trustee of the company, will nominate a director to fill it.

To Ship 1200 Planes a Month

U. S. Will Send Them to Allies in Parts—Mechanics Already There for Assembling Work

WASHINGTON, March 18—From 1200 to 1500 finished airplanes will be delivered every month to the Allies beginning Sept. 1, according to announcement made here yesterday. The planes will be shipped in parts and assembled in France or England, where mechanics have already been sent in special units for this purpose.

Recruiting for the non-flying branch of the aviation service has been temporarily suspended, as more men have volunteered than are needed at present. The progress made in aviation in this country is, according to army officials, greatly in excess of their hopes. One thousand men have been arriving daily at Kelly Field, Tex., for the past month, and additional barracks had to be constructed for them.

American-built battle planes, it is said, will be in France by July in sufficient quantities to insure adequate air protection of the sectors held by American troops. Figures on the aviation situation were placed before the full membership of the House Military Committee yesterday by Acting Secretary of War Crowell. It was disclosed that the aviation program is somewhat behind schedule, with production about 60 days delayed. Statements were made to the effect that there has been too much optimism and too many over-optimistic predictions, and if it were not for these the work of the Aircraft Production Board would already have been recognized as an extraordinary achievement.

The foreign contracts, which were to have provided the initial fighting equipment for General Pershing's air forces, were said to be still further behind the program.

Estimates of the time required to get a completed battle plane from the factory in the United States to the front in France have been placed at 90 days. The War Department is now endeavoring to cut that period in half, and this will be one of the main duties of the new committee headed by Snowden Marshall, which was announced last week.

—

New York S. A. E. to Meet March 28

NEW YORK, March 16—The next meeting of the Metropolitan Section of the S. A. E., to be held on March 28, will have as its topic the Steam Vehicle—Its Past, Present and Future. Papers on the subject will be read by John Sturgess, of the Stanley Motor Carriage Co., and Abner Doble, of the Doble-Detroit Steam Motors Co. The meeting will be held in the assembly room of the Automobile Club of America, Fifty-fourth Street, and will be preceded by a dinner of the section.

Tractor Men Form Organization

26 Manufacturers Meet in Chicago and Perfect Semi-Permanent Conference

CHICAGO, March 15 — Twenty-six manufacturers of tractors met at the Congress Hotel yesterday and organized an "informal and voluntary" association of tractor manufacturers under the name of the National Conference of Tractor Manufacturers. The conference was called by Daniel F. Charmichiel, of the New Age Tractor Co., Minneapolis. Clifford Thorne, attorney for the Square Turn Tractor Co., Chicago, acted as secretary.

The Chicago meeting grew out of a conference of a few of the tractor manufacturers which was called to meet recently at Washington, D. C., by A. Violette, of the Wayne Tractor Co., Detroit, Mich.

A semi-permanent organization was perfected, with the direction of the affairs of the association vested in an executive committee consisting of D. F. Charmichiel, Minneapolis, chairman; F. H. Cozzens, New York, vice-chairman; W. B. Gleeson, Minneapolis, secretary; G. S. Albaugh, Chicago, treasurer, and A. Violette, Detroit.

In accordance with a resolution introduced by Albaugh, and which was passed unanimously, a Tractor War Service Committee was appointed, consisting of James R. Collins, Peoria; D. F. Charmichiel, Minneapolis; A. Violette, Detroit; W. R. Gleeson, Minneapolis; H. D. Lauson, New Holstein, Wis.; G. S. Albaugh, Chicago; F. R. Beeman, Minneapolis; F. H. Cozzens, New York; J. M. Robinson, Peoria; John Hurlbut, Detroit; D. Fitchian, Waterloo, Iowa; R. T. Evans, Hudson, Ohio, and H. W. Adams, Minneapolis.

According to Chairman Charmichiel, the purposes of the conference are to eliminate some of the unfair practices which have crept into the tractor trade, to stabilize the business of building tractors, to provide an organization in which all shall have the right to a free expression of opinion and which shall not be dominated by a single personality, to gather statistics regarding the tractor industry to be presented to the Government in substantiation of the contention that the tractor industry is an essential, and thus to win the confidence of the Government and secure a greater measure of preferential treatment.

It is hoped to secure the active cooperation of all of the tractor manufacturers in the country, all of whom will be asked to join the association, and to offer the combined efforts of the industry to the Government to work in harmony with the agricultural department and the food commission to the end that the tractor industry may be stimulated and sustained and that the food production capacities of the country may be increased.

The following companies were represented at the conference:

The Peoria Tractor Corp., Peoria, Ill.; Stinson Tractor Co., Minneapolis; Beeman Garden Tractor Co., Minneapolis; Gilson Mfg. Co., Port Washington, Wis.; Strite Tractor Co., New York; Gile Tractor & Engine Co., Ludington, Mich.

Acme Harvesting Machine Co., Peoria, Ill.; National Tractor Co., Chicago; the John Lauson Mfg. Co., New Holstein, Wis.; Interstate Tractor Co., Waterloo, Iowa; Appleton Mfg. Co., Batavia, Ill.

Common Sense Gas Tractor Co., Minneapolis; Leonard Tractor Co., Jackson, Mich.; Topp-Stewart Tractor Co., Clintonville, Wis.; Lang Tractor Co., Minneapolis; Reed Foundry & Machine Co., Kalamazoo, Mich.

Square Turn Tractor Co., Chicago; Elgin Tractor Corp., Piqua, Ohio; New Age Tractor Co., Minneapolis; Wayne Tractor Co., Detroit; Illinois Silo & Tractor Co., Bloomington, Ill.; F. C. Austin Co., Inc., Chicago; Gray Tractor Co., Inc., Minneapolis; Leader Tractor Co., Des Moines; Andrews Tractor Co., Minneapolis; Evans Mfg. Co., Hudson, Ohio.

—

Pierce-Arrow Earnings About $11 a Share

BUFFALO, N. Y., March 18 — The Pierce-Arrow Motor Car Co. in its annual report to stockholders, to be issued in a few weeks, will show a surplus of $3,550,000, after deduction of war taxes and depreciation reserve. When allowances for an 8 per cent dividend on the $10,000,000 preferred stock are made, the earnings equal $11 a share on the 250,000 shares of common stock outstanding.

In 1916 profits were equal to $13.08, without any deduction for taxes. The balance sheet shows that current assets exceed current liabilities by $12,000,000.

—

White Company Earns $3,800,000

CLEVELAND, March 20—The White Co. earned profits of $3,800,000 in 1917, according to a preliminary report. This is after all deductions, including reserves set aside for taxes, are made, and equals $12 a share on the 320,000 shares of stock (par value $50) outstanding, or three times the present rate of dividends. The balance sheet shows current assets of nearly $15,600,000 and current liabilities of $2,600,000, leaving a working capital of $13,000,000. The White Co.'s report will be given out just prior to the annual meeting of stockholders, which is scheduled for April 8.

—

Daylight Saving Bill Passed

WASHINGTON, March 19—Congress has passed the daylight bill and it has been signed by the President. The bill is designed to save time, light and fuel. It will also supply an additional hour for home gardening by city and suburban dwellers. Clocks will be turned one hour ahead at 2 o'clock in the morning of the last Sunday in March and will be turned back one hour at the same time on the last Sunday in October.

J. I. Case Co.'s Profits Doubled

Earnings Amount to $18 a Share on Common—35 Per Cent Increase in Sales

RACINE, WIS., March 20—The J. I. Case Threshing Machine Co. shows gross sales of $17,657,753 in 1917, an increase of $4,066,854 over 1916. Net income increased from $2,658,997 in 1916 to $4,066,854 in 1917. The surplus for the year, after deducting all fixed charges, reserves, preferred dividends, etc., amounted to $1,506,273, or $18.14 a share on all outstanding common stock. This is almost double the 1916 earnings.

The net income account and balance sheet, as of Dec. 31, 1917, compare as follows:

	1917	1916
Gross sales	$17,657,753	$13,047,257
Net operating income	4,066,854	2,658,997
Interest	726,540	737,389
Depreciation	290,933	273,887
Federal taxes	275,000	.....
Contingent reserves	.....	.....
Extra charges	*417,608	.....
Balance	$2,356,773	$1,647,721
Preferred dividends	850,500	850,500
Year surplus	†$1,506,273	$797,221

*Premium on bonds bought, $143,315; and $274,293 war losses abroad.

†Equal to $18.14 a share on $8,300,000 common stock, as compared with $9.60 a share in 1916.

The balance sheet of the J. I. Case Threshing Machine Co., as of December 31, 1917, compares as follows:

Assets

	1917	1916
Property account	$11,820,915	$11,801,030
Inventories	12,814,180	9,881,337
Customers' notes	8,512,455	12,766,829
Accounts received	1,121,173	397,641
Investment in Case de France Co.	519,637	362,387
Due account prop. sold	175,000	.....
Liberty and other bonds	263,969	.....
Miscellaneous realty	182,704	202,370
European funds	1,759,997	1,281,375
Cash	*1,492,167	821,630
Deferred charges	568,597	663,266
Total	$39,230,796	$38,177,866

Liabilities

	1917	1916
Preferred stock	$12,150,000	$12,150,000
Common stock	8,300,000	8,300,000
Funded debt	6,012,000	9,000,000
Real estate mortgage	.....	.....
Bills payable	2,225,000	750,000
Accounts payable	1,332,441	1,017,625
Federal tax reserve	275,000	.....
Accrued interest, etc	580,245	282,851
Contingency reserve	2,300,000	1,500,000
Depreciation reserve	1,298,117	1,125,670
Surplus	8,356,109	4,051,719
Total	$39,230,796	$38,177,866

*Includes $497,000 deposited with trustee under terms of trust deed.

Foreign trade showed a marked increase, most of the orders coming from the allied governments, subject to cash payment in this country.

Wave of Prosperity in Cleveland

War Industries in Full Swing—Exceedingly Productive Season Reported

CLEVELAND, March 19—Cleveland is experiencing a wave of business prosperity, as its war industries are organizing themselves into full swing and its commercial business barometer is rising rapidly. A large group of automobile, truck and parts manufacturers are located in Cleveland and without exception they report an exceedingly productive season.

The White Co. is utilizing only a small part of its productive facilities for passenger car work. The demand is comparatively small for a car of this price, but truck business is especially good. The company is busy with war truck production. Little of this is United States war business, due to the fact that the company is heavily involved in transacting business with the Allies, particularly France. It is making, however, some trucks for the United States.

Malleable Putting Up Plant

The National Malleable Castings Co. is putting up a large new plant and within 30 days will be in production here. The old plant will be continued due to the great amount of orders, most of which are of war contracts. Castings for barrels of trench mortar shells and also small castings for hand grenades are being turned out in large quantities by the company.

The Willard Storage Battery Co. is producing about 60,000 batteries a month. This is slightly less than a year ago, on account of reduced passenger car production. Nevertheless, the decrease is relatively small because of increased sales by dealers throughout the country. The business is gaining rapidly, and if the present increases continue, it will soon be on the same basis as a year ago, according to reports.

The Chandler Co. is well under way with its large tractor building, as was reported recently in AUTOMOTIVE INDUSTRIES. It is believed that this business will not be in full swing for 2 or 3 years, although production may start about August.

Martin Corp. Building

A large plant is being erected for the Glen Martin Aircraft Corp., which, it is expected, will be one of the leading aircraft companies in the vicinity of Cleveland. A great interest is taken in the matter by citizens of Cleveland, who aspire to have Cleveland known as an airplane manufacturing center.

The Jordan Motor Car Co. is doing good business throughout the entire country, particularly in the South, where express shipments are being made whenever it is possible to get express equipment. This, fortunately, has been possible during the last few weeks, although predictions are that it will become increasingly difficult to obtain this. The production aimed at is about 50 a week by April. Cars are being driven overland to Chicago and points in the Middle West. It is impossible to drive South, but express shipments heretofore have taken care of deliveries to this part of the country. Jordan has 153 orders on hand for immediate delivery.

—

Winton Prices Increased

CLEVELAND, March 18—The Winton Co. has increased the factory prices of its 33-hp. cars $200 and its 48-hp. cars $350. The new prices compare as follows:

Model 33 hp.	Old Price	New Price	Increase
Roadster	$2950	$3,150	$200
Cloverleaf	2,950	3,150	200
Touring car, 4- and 5-pass.	2,950	3,150	200
Touring car, 6-, and 7-pass.	3,000	3,200	200
Coupelet	3,265	3,465	200
7-pass. touring, with permanent top	3,600	3,800	200
4-door convertible sedan	4,000	4,200	200
Limousine	4,200	4,400	200
48 hp.			
Roadster	$3,500	$3,850	$350
Cloverleaf	3,500	3,850	350
Touring car, 4-, 5-, 6- and 7-pass.	3,500	3,850	350
Limousine	4,500	4,850	350
Sedan	4,750	5,100	350
Limousine landaulet	4,750	5,100	350

—

Marmon Prices Increased

INDIANAPOLIS, March 19—Factory prices of open models of Marmon cars were advanced $200 yesterday. The prices are:

Model	Old Price	New Price
7-Pass. Touring Car	$3550	$3750
4-Pass. Roadster	3550	3750
5-Pass. Touring	3500	3700
Chassis with cowl	3250	3450

There has been no change in the price of the closed cars.

—

Price of Grant 6-Passenger Raised

CLEVELAND, March 19—The Grant Motor Car Co. has advanced the price of its 6-passenger models from $1,055 to $1,095, an increase of $40.

—

Studebaker Commercial Cars Higher

DETROIT, March 20—Prices of all Studebaker commercial cars have been increased $100. The advanced cost of materials and increased manufacturing charges are assigned as reasons.

New prices of the Studebaker commercial cars follow:

Model	Old Price	New Price
½-Ton		
Panel delivery	$985	$1085
Express	980	1080
Station wagon	985	1085
Chassis	945	1045
1-Ton.		
Stake body	1450	1550
Express	1400	1500
16-Pass. bus	1600	1700
Hearse chassis	1500	1600
Chassis	1300	1400

Increasing Business for Detroit

Manufacturers Reorganizing Traffic Bureaus to Cope with Freight Situation

DETROIT, March 20—Manufacturers in this city and the surrounding territory report good business development. Although the freight situation is relieved to some extent, it is by no means back to normal. Most manufacturers, however, have had less difficulty in shipping cars during the last few weeks. The percentage of drive-aways is increasing from day to day, and many manufacturers are increasing their production.

Traffic departments have been reorganized to cope with the new situation. If the old methods were practised at this time the number of freight cars obtained would be even less than the number procurable now. Some companies have crews continually scouring sidings for empties. The minute they see a car being unloaded they make arrangements to obtain it for their company and usually these cars are loaded with automobiles without being moved.

Despite mild weather and heavy rains, which have made the roads troublesome to drivers, dealers are begging to drive away cars. One dealer came from Kansas with five women and a man to drive cars from the Briscoe plant.

The Maxwell company has adopted a new plan, which makes it possible for one man to drive two cars. The company has found that sending out 10 cars with 5 drivers is most satisfactory. Each car trails another.

The Federal Motor Truck Co. states that the East is waking up to the use of the truck and good business is reported in that section. During the Boston show the company sold more than one truck a day.

—

A. A. A. Changes 2 Committee Heads

NEW YORK, March 20—Clifford Ireland has been appointed chairman of the Legislative Committee of the American Automobile Association, succeeding O. I. Yellott, who has resigned. Mr. Ireland has been head of the Touring Board and his place there has been taken by Carl G. Fisher.

—

No Vote of Confidence

In a news item appearing in AUTOMOTIVE INDUSTRIES of Feb. 21 relative a meeting of the National Automobile Chamber of Commerce and the Motor and Accessory Manufacturers Assn. on Feb. 14 there is a misstatement. This item says: "A unanimous vote of confidence was given Christian Girl for the manner in which he is carrying on his work."

No vote of confidence was asked and no vote of confidence was given.

Urge Widest Possible Use of Trucks

Council of National Defense Asks Help of States—Centralized Highway Control Essential

WASHINGTON, D. C., March 19—The first Government expression concerning the broader use of motor trucks and building roads suitable for them has come from the Council of National Defense, which states that it favors the widest possible use of motor trucks for highway transportation as well as the removal of regulations restricting and discouraging the present use of highways for this purpose. The statement issued by the Council of National Defense is:

"The Council of National Defense approves the widest possible use of the motor truck as a transportation agency, and requests the State Councils of Defense and other State authorities to take all necessary steps to facilitate such means of transportation, removing any regulations that tend to restrict and discourage such use."

Depression in Road Building

Since Nov. 1, 1917, when Priority Order No. 2 was issued through the Council of National Defense, prohibiting the use of open-top railroad cars for the transportation of road-building materials, the road-building movement in general has been under a cloud of depression, and this is the first broad ray of sunshine that has come. The Quartermaster's Department by driving overland war trucks from Detroit and Buffalo to the number of nearly 500 has demonstrated the super-essential characteristic of highways in war times. The development of the rural express systems in Maryland has brought to the attention of the Government the factor that good highways constitute by preventing the waste of farm products due to getting them to the city not only quicker, but where it is impossible without motor apparatus. The return-load movement in Connecticut has constituted another chapter in the super-essential characteristic of roads in war time. The snow-removal work of Pennsylvania has demonstrated how road-maintenance cost is reduced by snow removal and how mountain highways are converted into useful channels of transportation during winter months when the carrying capacity of railroads is off and when the carrying capacity of highways is needed.

At present the highway situation of the nation, so far as appropriations is concerned, rests almost entirely in the hands of W. G. McAdoo in that he occupies the dual position of Secretary of the Treasury and Director of Railroads. As Secretary of the Treasury he has complete control of every appropriation made for highways. These appropriations are passed upon by what is known as the Capital Issues Committee, which must approve of every bond issue of $100,000 or over for highway construction. Through his position as railroad dictator Secretary McAdoo entirely controls the transportation of road-building materials. As soon as he took charge of the railroads Priority Order No. 2, prohibiting the shipment of road-building materials in open-top railroad cars, was rescinded.

Centralized Authority Essential

What is really needed in Washington today is some centralized authority on highways. While Secretary McAdoo holds the key to the situation he should have some representative or some committee which would constitute a centralized authority on everything relating to the highways. There are many activities for such a centralized committee.

There is the attitude toward transportation of road material which generally must be carried on railroad cars.

There is the necessity of the nation deciding on what constitutes a suitable road for modern highway traffic.

There is the necessity for such a centralized committee that would have authority to state what constitutes a permissible load to be carried on highways.

There is the necessity for such a centralized committee to decide if Federal registration of motor trucks would not be desirable, in fact almost necessary under the new system of highway transportation.

Must Decide Maintenance Percentage

There is the necessity for such a centralized committee to determine what percentage of highway maintenance should be paid by the users of highways and what should come out of the general fund. At present there seems to be no consensus of opinion on this subject and the different States are constituting laws unto themselves in this respect. An example is Maryland, which charges $342 per year registration tax on a 5-ton truck and has a bill before its legislature to double this tax. The State further threatens to again double this tax at a meeting of its legislature 2 years hence, at which time the tax would be four times what it is at present.

There is the necessity for such a centralized committee which would define exactly what is an essential, commercial, and military highway under war conditions.

There is the necessity for such a centralized committee to consider the question of snow removal in its broader sense and perhaps recommend what highways must be kept clear of snow during winter months for commercial and military reasons.

There is the necessity for such a centralized committee to determine what appropriation the Federal Government should make for the maintenance of those highways over which its transportation is passing. Great Britain has already found it necessary to make appropriations to local authorities for wear and tear on their highways due to war traffic by motor truck. Different States in the U. S. A. are faced with the same problem today.

There is the necessity for such a centralized committee to determine the carrying capacity of bridges on main highways of military and commercial value. At present some bridges in New York State are not strong enough to carry 5-ton loads of war trucks, and the transportation of supplies for our army in France is being delayed because of this. The problem has already become one of Federal importance more than merely a matter of State importance or importance to some local community in a State.

That there is the necessity for such a centralized committee is indisputably demonstrated by the troubles on the Lincoln Highway on the boundary between Pennsylvania and Ohio, where there is a short linkage of unimproved highway, making it necessary to load the Government war trucks which are being driven from Detroit to Baltimore onto railroad cars to get them over this short stretch.

New York Refused to Remove Snow

That there is the necessity for such a centralized committee is further indisputably demonstrated by the fact that New York State refused to remove the snow from the Buffalo-Albany route, and as a direct result of this motor truck trains from Buffalo to seaport were 8 to 10 days longer making the trip than they should have been, while at the same time General Pershing was sending urgent cables for these very trucks. While in war it is no time to leave it to the whims of a State whether it will remove snow from its highways or not when the issues of a nation are at stake.

That there is necessity for such a centralized committee is further demonstrated by the hopeless lack of co-ordination among highway systems, inland waterway systems, railway systems, trolley systems, and others on which falls the burden of a nation's transportation.

Changes on Boston Motor Row

BOSTON, March 19—There have been several changes on Boston's Motor Row in the last few weeks. The Shauk & MacMurray Co. has been taken over by the Utterback, Gleason Co., Dort distributer, and has dropped the Columbia car. The Hawley-Cowan Co., Saxon distributer, has been dissolved and its salesrooms rented by the Republic Truck Co. The Hinchcliffe Motor Co., handling the Jordan, has dropped the Kissel line,

which has not been placed yet. J. H. MacAlman, who handles the Stearns, has added the Liberty, and C. I. Crowell, who headed the Liberty agency, will be associated with him. George Dunham has resigned from the Stearns forces and taken the agency for the Standard eight. The Apperson Motor Co. has been formed to handle that line, and the Murray eight, formerly handled by the McCarthy-Meyer Co., has been taken on by George Leghorn, of the Hupmobile company.

—

66,545 Cars and Trucks in Western Canada

WINNIPEG, MAN., March 18—Official figures show that 66,545 motor vehicles were licensed in Manitoba, Alberta and Saskatchewan during 1917. This is an increase of 29,727 or 80 per cent over 1916. The greatest gains were made in Saskatchewan, where 33,562 motor vehicles were licensed last year, as compared with 15,654 in 1916. Alberta registrations jumped from 9,211 in 1916 to 16,000 in 1917, and Manitoba figures show total registrations of 17,393 last year as compared with 11,393 during the previous year.

—

Goodrich Company Changes

AKRON, March 16—At the annual meeting of the B. F. Goodrich Co. the retirement of $900,000 of the preferred stock, already authorized by the directors, was authorized by the stockholders. The old officers were re-elected, with the following additions as vice-presidents, H. K. Raymond, W. Rutherford, W. C. Geer and A. B. Jones. Waddill Catchings of Goldman, Sachs & Co., and F. C. Van Cleef were elected directors, succeeding Henry Goldman and F. A. Harding. At the meeting of directors, which followed the annual meeting, H. C. Miller was appointed manager of the tire sales department.

Detroit Leading in War Work

Has $500,000,000 Contracts for Government Trucks—Cleveland Second with Half the Amount

DETROIT, March 19—Detroit has received more than twice as many Government contracts for manufacturing, assembling and equipping motor trucks as any other city in the United States. Orders accepted by 50 manufacturers here aggregate $500,000,000. Cleveland is a weak second, with about $200,000,000 in contracts.

Contracts awarded to Detroit companies represent only part of the war work that is being done in the State of Michigan, as Grand Rapids, Flint, Lansing and many other cities are doing an immense amount of Government work.

Among the Detroit companies to whom contracts have been awarded are: Packard Motor Car Co., 1, 1½ and 5-ton trucks; Continental Motors Corp., Class B motors; Hinkley Motors Corp., Class B motors; Timken-Detroit Axle Co., Class B worm axles; Detroit Gear & Machine Co., clutches; Gemmer Mfg. Co., steering gears; McCord Mfg. Co., National Can Co., Long Mfg. Co., radiators; Detroit Pressed Steel Co., frames; Detroit Steel Products Co., springs; Michigan Malleable Iron Co., steel wheels; Hayes Mfg. Co. and C. R. Wilson Body Co., seat assemblies; Michigan Stamping Co. and International Metal Stamping Co., dashes; Hayes Mfg. Co., hoods, fenders, fan shrouds; Michigan Stamping Co., fan shrouds; Detroit Battery Co., batteries; Edmunds & Jones Corp., lamps; Schweppe & Wilt Mfg. Co. and Detroit Pressed Steel Co., reach rods and spray assemblies; Zenith Carbureter Co., carbureters; Michigan Stamp Co., bumpers; Oldberg Mfg. Co., mufflers; Gemco Mfg. Co., mufflers; National Machine Products Co., rear springs, shackle hub assemblies; Massnick Mfg. Co., parts for steering gears; National Machine Products Co., steering gears; Standard Brass Works, radiator parts; Burton Lowery Co., J. C. Wilson Co., Briggs Mfg. Co. and American Auto Trimming Co., upholstery, and Barey-Nicholson Co., wiring assemblies.

—

Detroit Center of Munitions Zone

DETROIT, March 18—Detroit will be the headquarters for one of the munition districts recently designated by the United States Government. The new plan is one of the results of the reorganization of the ordnance department a few months ago. Besides bringing the department into direct association with the industries, so that the work of turning out war materials may be followed up more closely, it also assures quicker payment for work done, better inspection facilities and more accurate information as to progress of the work.

Heretofore manufacturers and their representatives who went to Washington to obtain war orders lost time waiting for appointments with those in charge of the various departments. This will all be eliminated by the establishment of a central clearing house in Detroit.

Fred J. Robinson, of Lowrie & Robinson Lumber Co., and a member of the Detroit Board of Commerce, has been made chief of the Detroit zone.

The action of the Government in establishing a clearing house in Detroit for the ordnance department is in accordance with the efforts made by the Detroit Board of Commerce.

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'gs
*Ajax Rubber Co.	52	54	..
*J. I. Case T. M. Co. pfd.	85	87	+2
Chalmers Motor Co. com.	4	6	..
Chalmers Motor Co. pfd.	30	40	..
*Chandler Motor Co.	84	85	—3½
Chevrolet Motor Co.	117	121	—2
*Fisher Body Corp. com.	34	36	+1
*Fisher Body Corp. pfd.	80	87	..
Fisk Rubber Co. com.	50	53	..
Fisk Rubber Co. 1st pfd.	98	103	..
Fisk Rubber Co. 2nd pfd.	70	75	..
Firestone Tire & Rubber Co. com.	94	98	..
Firestone Tire & Rubber Co. pfd.	97	99	..
*General Motors Co. com.	122½	125	—1
*General Motors Co. pfd.	81	82	—1
*B. F. Goodrich Co. com.	43	45	..
*B. F. Goodrich Co. pfd.	99	100	..
Goodyear Tire & Rubber Co. com.	138	141	—1
Goodyear Tire & Rubber Co. pfd.	99	100	..
Grant Motor Car Corp.	2	4	+1
Hupp Motor Car Corp. com.	3	3½	..
Hupp Motor Car Corp. pfd.	78	83	..
International Motor Co. com.	18	22	+3
International Motor Co. 1st pfd.	50	55	+5
International Motor Co. 2nd pfd.	20	25	+3
*Kelly-Springfield Tire Co. com.	45	46½	+ ½
*Kelly-Springfield Tire Co. 1st pfd.	76	85	..
*Lee Rubber & Tire Corp.	12½	13½	—2½
*Maxwell Motor Co., Inc., com.	28	29½	— ½
*Maxwell Motor Co., Inc., 1st pfd.	59	60	—1
*Maxwell Motor Co., Inc., 2nd pfd.	22½	24½	+ ½
Miller Rubber Co. com.	130	133	—4
Miller Rubber Co. pfd.	95	98	+1
Packard Motor Car Co. com.	95	100	..
Packard Motor Car Co. pfd.	90	93	..
Paige-Detroit Motor Car Co.	18	20	..
Peerless Truck & Motor Corp.	16	17	— ½
Portage Rubber Co. com.	110	112	..
Reo Motor Car Co.	17	19	..

	Bid	Asked	Net Ch'ge
*Saxon Motor Car Corp.	9	9½	— ½
Standard Motor Construction Co.	11	12	..
*Stewart-Warner Speed. Corp.	54	56	..
*Studebaker Corp. com.	46	47	..
*Studebaker Corp. pfd.	91	94	..
Swinehart Tire & Rubber Co.	22	35	..
United Motors Corp.	28⅛	28⅜	+1⅜
*U. S. Rubber Co. com.	54	56	—1
*U. S. Rubber Co. pfd.	101	102	..
*White Motor Co.	42	43½	—2½
*Willys-Overland Co. com.	18¼	18¾	— ¼
*Willys-Overland Co. pfd.	81	82	..

*At close March 16, 1918. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	8	..
Bower Roller Bearing Co.	17¼	18¼	— ¾
Chevrolet Motor Co.	117	120	—3
Commerce Motor Car Co.	..	10⅝	..
Continental Motor Co. com.	5⅝	5¾	— ⅜
Continental Motor Co. pfd.	..	93	..
Edmunds & Jones com.	..	..	..
Edmunds & Jones pfd.	..	..	..
Ford Motor Co. of Canada	..	216	..
Hall Lamp Co.	14	14⅜	+ ½
Michigan Stamping Co. com.	12¾	13½	..
Motor Products	..	..	..
Packard Motor Car Co. com.	96	100	+3
Packard Motor Car Co. pfd.	90	90¾	..
Paige-Detroit Motor Car Co.	..	20	..
Prudden Wheel Co.	..	14¼	..
Reo Motor Car Co.	17⅜	17¾	— ⅝

INACTIVE STOCKS

Atlas Drop Forge	..	27¼	..
Kelsey Wheel Co.	86	93	..
Regal Motor Car Co.	..	26½	..

Men of the Industry

Changes in Personnel and Position

Colt Elected Chairman of U. S. Rubber Directorate

NEW BRUNSWICK, N. J., March 20—Samuel P. Colt, president of the United States Rubber Co., was elected chairman of the Board of Directors at the annual meeting of stockholders held yesterday. Samuel Myers, Ernest Hopkinson and J. Newton Gunn were elected directors. Gunn is president of the United States Tire Co.

—

Walter Campbell has been appointed assistant supervisor of materials at the Harroun Motors Corp., Wayne, Mich. He was formerly with the Hupp Motor Car Corp.

—

C. E. Lindsey, formerly manager of the Windsor branch of the Swedish Crucible Steel Co., Detroit, has been promoted to the position of sales manager.

—

R. C. Bridge, who has been associated with the Willard Storage Battery Co. on the Pacific Coast, has been appointed manager of the San Francisco district. He will have headquarters at 1380 Bush Street, San Francisco.

—

C. S. Harper, formerly district manager for the Willard Storage Battery Co. at San Francisco, will operate the Willard service station at Seattle.

—

Frank A. Kapp has become associated with the Associated Blue Book Publishing Co., New York. He was formerly advertising manager of the Mitchell Motors Co., Racine.

—

William P. Barnhart has been made assistant sales director of the United States Motor Truck Co., Cincinnati. He will have headquarters in Washington, where he will handle the business of the Stewart Iron Works and the United States Motor Truck Co.

—

W. F. Thompson has been appointed engineer of J. C. Widman & Co., Detroit, a furniture manufacturing corporation, which is engaging in airplane work.

—

L. R. Johnson, for the past 3 years auditor of the Jones Motor Car Co., Wichita, Kan., has been elected treasurer of the company.

—

Crosby White, formerly associated with A. J. Picard & Co., has been appointed traveling sales manager of J. H. Faw, Inc., New York.

Benjamin S. Rosenberg has been appointed manager of the New York office of the United Smelting & Aluminum Co., Inc., New Haven. He was formerly connected with Post Van der Burg & Co.

—

E. L. Lick has resigned as assistant manager of the car order department of the Willys-Overland Co. to become manager of the car order department of the Simons Sales Co., Toledo.

—

J. H. Teagan has been appointed export manager of the Hupp Motor Car Corp., Detroit, to succeed Charles Denby, who has entered government service. Teagan was formerly Denby's assistant.

—

O. S. Tweedy, manager of general branch sales of the U. S. Tire Co., has resigned, and has been elected vice-president of L. A. Young Industries, Inc., Detroit. He will leave the U. S. Tire Co. on April 15, and start active work in Detroit May. 1.

—

Liberty Engine Under Test

WASHINGTON, D. C., March 20—It is stated here that a 50-hr. test is being made of a Liberty airplane engine at Camp Bertner, Lake Charles, La., and officials of the Aircraft Production Board and the Aviation Section of the Signal Corps are awaiting results. It is expected that several trials and tests will be made here within the next two weeks of the Liberty airplane engine which arrived here a few days ago and is in a Curtiss plane.

—

Earning Power of Truck Service

NEW YORK CITY, March 20—An example of the earning possibilities of a motor truck in the parcel post rural delivery service was given at the annual dinner of the Motor Truck Club in this city last night by James I. Blakeslee, Fourth Assistant Postmaster General, of Washington. He has charge of this work, and looks to the time when there will be parcel post motor service over practically all the roads of America.

On a parcel post route from Philadelphia to Oxford, Pa., a round trip of 110 miles, a 1½-ton truck had made this trip every day all winter without a single exception. Mushroom growers at Oxford are shipping 1½ tons of mushrooms to Philadelphia each day. In the first 3 days the truck earned $30 per day charging parcel post rates for the work. This truck, in this service, can earn $12,000 a year and the service cost for this will be $4,200 a year.

Previous to starting this truck route, the mushrooms were shipped by railroad from Oxford to Philadelphia, a distance of 120 miles, whereas by motor truck the distance is only 55 miles.

Mr. Blakeslee cited many other examples to show that the earning powers of the motor truck in parcel post service, where it also carries first class mail, is so great that there is no question but that the entire service will be motorized as quickly as appropriations can be secured.

New Companies Formed

Latest additions to ranks of Automotive Industries

L. A. Young Interests Made Into One Company

DETROIT, March 20—L. A. Young Industries, Inc., has been formed to consolidate the interests in which L. A. Young, of Michigan, has been interested. The Detroit Wire Spring Co. will be the nucleus of the company, according to O. S. Tweedy, vice-president of the corporation. Other companies will also be consolidated but the names will not be announced until stock arrangements have been completed.

—

Ross Company to Make Trucks

SAGINAW, MICH., March 19—A new organization, to be styled Nelson B. Ross Motor Truck Co., has been formed in Saginaw. The firm is capitalized at $300,000 and will make heavy trucks. The paid-in capital is $175,000.

—

Furniture Company Making Truck Bodies

NORTHVILLE, MICH., March 19—The Globe Furniture Co. of Northville is now producing truck bodies, mostly of the stake type. The production averages 3 bodies a day.

—

Government Would Standardize Screw Threads

WASHINGTON, March 18—A bill was introduced in the House a short time ago providing for the appointment of a commission for the standardization of screw threads. It is provided that the commission shall consist of seven members to be appointed by the Secretary of War (one, a commissioned army officer), by the Secretary of the Navy (one, a commissioned naval officer) and by the Secretary of Commerce (five, of which one shall be the director of the Bureau of Standards, two from nominations made by the S. A. E. and two from nominations made by the A. S. M. E.)

The commission is to serve without pay and establish certain screw standards, which are to be submitted to the Secretaries of the Army, Navy and Commerce, and if approved by them shall be put in use in all plants controlled by the Army and Navy and, so far as practicable shall be used in all manufactured articles ordered by these departments. Hearings on the bill, which was introduced by Mr. Tilson, were given before the Committee on Coinage, Weight and Measures on March 5 and 7. The idea is to formulate complete screw standards with different tolerances. The bill, it was said, is chiefly a war measure.

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Steel Production Made Rapid Stride Last Week

Steel production with some companies has made a considerable stride forward in the past week, Steel Corporation plants apparently coming closer to normal capacity than the majority of independent producers. A 10 per cent increase over the February rate represents the average condition. The situation as to cars and motive power is still a serious one and promises to continue so.

Iron and steel manufacturers entered the price conference with the War Industries Board at Washington Wednesday knowing that they would be asked to make reductions on some products, particularly pig iron. Producers of foundry iron strongly oppose lower prices, and a compromise may be made by reducing basic iron $1, or to $32, and Bessemer iron, which is 10 per cent higher, from $36.30 to $35.20. There is a probability, too, of some downward revision in scrap, in certain forms of which competition has already brought reductions from the Government basis.

On some finished products which have been considered out of line the Government will also seek reductions. How strongly these will be pressed depends upon the extent to which Washington considers the output of smaller high-cost plants to be essential to the carrying out of its program. On the score of securing the largest possible output of pig iron and steel from the available coke, current priority decisions tend more and more to throw smaller iron and steel plants into idleness, and the development of this policy is being watched closely throughout the industry.

No material or general readjustment of existing prices for rolled products is looked for, and the steel men contend that the uncertainties of the situation, which are already affecting demand, should be removed by making the new prices effective for at least six months.

Apart from the special plea of two large consuming interests for a reduction in Southern pig iron, because they located plants in the South to get the benefit of its low pig-iron costs, manufacturing buyers of iron and steel figure in no formal way in the present Washington conference.

Somewhat conflicting statements are made as to the extent to which Government and general business needs will take up steel-making capacity in the remainder of the year.—*Iron Age.*

—

No Present Change in Steel Prices

WASHINGTON, March 20—Existing prices for iron and steel are to be maintained for at least the next three months. This statement comes as a result of the conference between the War Trade Board and the representatives of the iron and steel industry which met in Washington yesterday.

—

$100 Increase on Columbia Cars

DETROIT, March 19—The Columbia Motors Co. has increased the prices of its models $100. They are:

Model	Old Price	New Price
5-Pass. touring	$1350	$1450
4-Pass. roadster	1495	1595
Sedan	2395	2495

The company will start the manufacture of trailers before the end of the month. The building formerly used as a storehouse will be turned into a trailer assembling shop.

—

Slight Advance in Oldsmobile Prices

LANSING, MICH., March 20—There has been a slight increase in the price of Oldsmobile models, as follows:

Model	Old Price	New Price
8-Cylinder touring	$1467	$1495
6-Cylinder roadster	1185	1195
6-Cylinder touring	1185	1195

—

Five Scientists to Test Garabed

WASHINGTON, March 20—Garabed T. K. Giragossian, the inventor of the new so-called virgin force which he calls Garabed, has submitted a list of nineteen scientists to Secretary of the Interior Franklin K. Lane. Secretary Lane has selected ten scientists from this list from which Giragossian will finally choose five to act as witnesses for the official test of the free energy generator. The names of the scientists together with all details of the tests are kept secret.

—

Detroit-Pittsburgh in 3 Days

DETROIT, March 18—A fleet of trucks were driven from the Standard Motor Truck factory to the Pittsburgh distributer, the Wilmer Sales Co., in 3 days' time.

A New Service

¶ Herewith AUTOMOTIVE INDUSTRIES *supplies for the benefit of its readers a general summary of important developments in other fields of business. This is rendered possible by the editorial co-operation of leading industrial publications which are recognized authorities.*

By compressing the general industrial situation into this form we hope to give our readers a clear and comprehensive idea of up-to-the-minute developments which they could otherwise secure only with considerable expenditure of time and effort.

Tone of Coal Market Generally Satisfactory

The tone of the coal trade is generally satisfactory. With the moderating weather, dealers are noticing a tendency toward an easier market. Domestic consumers are not so urgent regarding deliveries, though demand in all lines is still ahead of the supply.

In face of the repeated urgings of the Fuel Administration that householders stock their next winter's coal early, the demand from this class of buyers is disappointing. This may be attributed to the fact that the public generally seems to feel that the price of coal will come down on April 1 and, therefore, hesitates to place orders at the old figure. Also, dealers do not seem anxious to force sales until some sort of assurance is had that they will receive sufficient coal to take care of a strong early demand, as the quantity of coal now in storage is not great.

The improvement in rail movement during the last two weeks has failed to continue. The lines are again congested and there has been an appreciable falling off in the number of cars supplied to the mines. Few operators report more than a 50 per cent car supply, with the majority of shippers down to 25 per cent and lower. This means that the country will be faced with an even more serious fuel shortage next winter, unless the Government takes immediate preventive steps.

Consumers will likely have to pay more for their coal during the coming summer than they did the past winter, owing to the fact that the Interstate Commerce Commission has granted the railroads a freight rate increase of 15 per cent on bulk commodities, including coal. This increase, which will apply to all shipments east of the Mississippi River and north of the Ohio and Potomac Rivers, will mean an increase of from 18 to 30 cents a ton on the domestic sizes.—*Coal Age.*

—

G. M. Ratifies Stock Increase

NEW YORK, March 20—Stockholders of the General Motors Corp. have ratified the proposal to increase the capitalization of the company to $200,000,000; the action, suggested when the Chevrolet Motor Co. was made a division of the General Motors Corp., was taken at a special meeting to-day. The new issue will consist of $50,000,000 six per cent preferred and $150,000,000 common. The following directors were elected: P. D. du Pont, A. G. Bishop, W. P. Chrysler, R. H. Collins, W. L. Day, H. F. du Pont, Irene E. du Pont, W. C. Durant, J. A. Haskell, L. G. Kauffman, J. H. McClement, C. S. Mott, J. J. Raskob, F. W. Warner, and E. B. Linden.

Packard Truck Trains for Soldiers

DETROIT, March 16—Sixty Packard trucks are being driven from the Detroit factory daily, carrying two companies of soldiers. Six Dodge cars are also assigned to each company. The truck trains go via Toledo to the seaboard. Last week the total drive-aways from the Dodge Brothers factory alone amounted to more than 2400 cars.

—

Chevrolet Annual Meeting Postponed

NEW YORK, March 19—The annual meeting of stockholders of the Chevrolet Motor Co., which was to have taken place yesterday, has been deferred. It is understood that the postponement was necessitated by the recent decision to absorb the General Motors assets. The new date will be fixed shortly.

—

Reo Benefit Assn. Elects Officers

LANSING, March 19—The Reo Benefit Assn. has re-elected Jesse L. Stanley president. Clare Warner is vice-president; Don Gardner, secretary; Charles Coy, treasurer, and Fred Ackley and Herman Troy, trustees. The disbursements of the association for the year were $22,927.95, and the receipts of the benefit store were $55,261.30. The association assisted in many cases of sickness and injury to employees of the company.

Ohio Puts Aside $1,000,000 for Tractors

COLUMBUS, OHIO, March 19—State officials of Ohio are preparing a plan to purchase $1,000,000 worth of farm tractors and furnish them to farmers. The assistance of bankers and manufacturers has already been enlisted, and the state has set aside the money for the purchase. This will be loaned out to several country banks, which will finance farmers who require tractors.

An extensive plan for educating farmers in the use of tractors has also been worked out by the state. A school was opened on Feb. 11 on the state fair grounds here, and additional schools are being provided in several county seats.

Pennsylvania's Example of War Roads

(*Continued from page* 601)

The heavy war trucks which are coming over the road for that department are now being carried around this bad road on railroad flat cars. Such transportation is not available for privately owned trucks.

And yet this road was in fair condition a few weeks ago when it was frozen. It will be perfectly passable again as soon as the warmer weather has dried it out. When authentic information is received that this stretch of road has thoroughly dried out, no one need hesitate to drive over the road from the Great Lakes to New York by way of Pittsburgh and Philadelphia.

The State of Pennsylvania has done wonders in road-building during the last few years. The road from Philadelphia to Pittsburgh is practically a boulevard all the way, particularly the western portion, which has been completely rebuilt. The water-breaks on the mountain roads, once the terror of tourists, have all been eliminated, and the roads are drained by a modern system of culverts. There remain the usual bad spots on the outskirts of the towns, between the points where the State highway ends and the city pavement begins. Not only has the State of Pennsylvania constructed its main roads well, but it also maintains them in good order. The State owns a fleet of White dump trucks which constantly patrol the main roads. As soon as a hole is discovered, in goes a shovelful of gravel. As we had occasion to observe, the chauffeurs are expert axe-men as well, and when a tree is blown across the road it is quickly removed.

In New Jersey the roads of that State are not much to be proud of. There are stretches of fine roads, alternating with stretches of badly worn-out roads. The roads between Jersey City, across the Hudson from New York City, and Trenton are subjected to the wear of numerous heavy motor trucks in transit between New York and Philadelphia, but where the roads have been properly built, they show no signs of wear. The road leading into New Brunswick, built a number of years ago, is as good as it ever was, while the old water-bound macadam roads have gone to pieces.

Why is it that the State of Pennsylvania, which has done so much to build up its highway system and which has constructed a good road from Philadelphia across the State to Pittsburgh, and thence to Beaver Falls, should tolerate such road conditions as those existing beyond Beaver Falls?

Why is it that the counties of Ohio which have built so many miles of fine roads, including a good road from Cleveland to New Springfield, should neglect the few miles of road southeast of the latter town?

The answer is that each State has looked on its highway system as being purely a State problem. There is no town of any size in Pennsylvania northeast of Beaver Falls, so why build a road to a jumping-off place on the State line? Similarly, they reason in Ohio, "We will connect our own cities, but why spend money in improving a road to a little hamlet on our eastern boundary line?"

Fortunately, this condition of State insularity is disappearing. Pennsylvania has already declared its intention of improving its share of this stretch of road during the coming summer, and Ohio now sees the importance of taking care of its part of the road. In the meantime, now, while the frost is coming out of the ground, and next summer, when the road gangs get to work, the shortest and in every other respect the best highway for motor transportation between the Middle West and the Atlantic seaboard is practically blocked.

It is obvious that two points in our road-building and road-maintaining program must be emphasized as they never have been before.

First.—Each State must build and maintain its roads, not only from the State point of view, but also from a national point of view. It must examine into the question as to how its system of state highways fits into the general scheme of national arteries of transportation. If it has not linked up its State system of good roads with the system in each adjoining State, it must do so at once.

Second.—Each State must be made to see not only the necessity, but also the ultimate economy, of keeping snow off its roads in winter. If snow covers the roads during four or five months of the year, that means that every motor vehicle traveling over the roads during that period is using tire chains. It means further that every time there is a thaw, the water, instead of running off the road, is trapped by the snow and is held on the road to be subjected again and again to freezing and thawing with resulting disintegration of the road surface. If the snow is removed promptly from the road, tire chains are not necessary on the vehicles using the road, and the road is freed from the destructive action of recurrent thawing and freezing. The net result of keeping snow off the roads is a tremendous saving in road maintenance. This is not merely a theoretical consideration, but has been proved this year on the Philadelphia-Pittsburgh highway. This road, as already noted, has been kept free from snow, with the result that, despite the abnormally heavy traffic, the road is in need of fewer repairs this spring than in any previous year.

Any road was formerly considered a good road from the motoring point of view if it was maintained in satisfactory condition during the touring season—say from the middle of April to the first of December. It was taken as a matter of course that in the remaining four and one-half months of the year the winter snows and the spring thaws would render it more or less impassable. To-day, under war conditions, no community can boast of having good roads unless its roads are open for motor traffic twelve months in the year. If the highways are to supplement, as they must supplement, the railroads of the country in meeting the transportation needs of the times, the roads must be kept in condition all the year, just as are the railroads.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

United States Rubber Purchases Alco Plant

PROVIDENCE, R. I., March 18—The United States Rubber Co. has purchased the plant of the American Locomotive Co. here, which consists of about 10 acres of land with extensive buildings, and adjoins the Revere plant of the United States Rubber Co. It is understood that the purchase price was about $500,000.

According to President Colt, the company will immediately equip part of the plant for the manufacture of truck tires. Another part will probably be used for making balloons for the United States Government.

The plant was originally built by the American Locomotive Co. for the manufacture of Alco cars, which enterprise was abandoned in 1912. Lately it has been used for munitions work.

—

International Motor to Build Annex

PLAINFIELD, N. J., March 9—The International Motor Co. has prepared plans for the erection of a 4-story building adjoining its plant on West Front Street. There will be 85,000 sq. ft. of floor space in the annex, most of which will be used as a factory and the remainder as a stock room.

—

New Winther Model Completed

KENOSHA, WIS., March 18—The Winther Motor Truck Co. has completed the first model of a new type of quadruple drive motor truck designed especially for army service, and the car is now in the hands of Government engineers for exhaustive tests.

—

35 Per Cent Gain in Goodyear Sales

AKRON, OHIO, March 18—Sales of the Goodyear Tire & Rubber Co., according to estimates, will aggregate $150,000,000 for the 10 months ending Oct. 31, 1918, a gain of 35 per cent over 1917. Gross business is about 40 per cent heavier than a year ago, and three-quarters of this is represented by tire sales. Non-tire products turned out by the company last year amounted to $25,000,000, and this year will probably reach $35,000,000, or approximately 16 per cent.

—

Canadian Branch for Monarch Tractor

WATERTOWN, WIS., March 18—The Monarch Tractor Co., Chicago, Ill., with main works here, has organized the Monarch Tractor Co., Ltd., of Canada, to handle its business in the Dominion and to own and control a branch plant to be erected there at once. The Watertown works also will be enlarged to better enable the company to meet the demand for tractors.

—

Commerce Gets $2,000,000 Contract

DETROIT, March 16—The Commerce Motor Car Co. has received a government contract for more than $2,000,000 worth of Commerce trucks. To carry the heavy inventory the company has authorized the sale at par of $100,000 of treasury stock. This will be offered to stockholders in the ratio of one for every three shares held.

—

Detroit Pressed Steel Has Signal Corps Order

DETROIT, March 18—The Detroit Pressed Steel Co. has received an order from the Government for 19,000 steel wheels for the Signal Corps. Production on this order started 30 days ago, and the first delivery will be made this month. It is expected the order will be completed by the end of May.

—

30 Duplex Trucks a Month

LANSING, MICH., March 18—The Duplex Truck Co. will increase its production to 300 trucks a month for the remainder of the year.

—

Addition for Ladish Drop Forge

CUDAHY, WIS., March 18—The Ladish Drop Forge Co. will erect a new drop forge shop. This will be ready June 1.

—

Dividends Declared

The Edmund & Jones Corp. has declared the regular quarterly dividend of 1¾ per cent on preferred stock, and 25 cents a share on the common stock, payable April 1 to stock of record March 20.

—

The Keystone Tire & Rubber Co. has declared the regular quarterly dividend of 2 per cent and an extra dividend of one-third of 1 per cent on preferred stock, and a regular quarterly dividend of 3 per cent on the common stock, payable April 1 to stock of record March 22.

—

The Air Reduction Co. has declared regular quarterly dividends of $1 on the common stock and 1¾ per cent on the preferred stocks, payable April 15 to stock of record March 30.

—

The Reo Motor Car Co. has declared the regular quarterly dividend of 2½ per cent on common stock, payable April 1 to stock of record March 15.

—

The Pennsylvania Rubber Co. has declared a regular quarterly dividend of 1½ per cent on common stock, and 1¾ per cent on preferred stock, payable March 30 to stock of record March 15.

—

Capital Increase

GREENVILLE, MICH., March 18—The Tower Motor Truck Co. has increased its capital stock from $100,000 to $200,000.

Plans Already Completed for Ford's Tractor Plant

DETROIT, March 18—The permanent tractor plant of Henry Ford & Son will be located on the Ford property directly opposite the blast furnaces. It will employ approximately 25,000 men. The Dearborn plant was used as an experiment station and 50 different models were built before the present perfected tractor was decided upon.

The permanent plant will include a foundry, 120 x 225; stock room, 30 x 100; heat treating room, 40 x 145; assembly shop, 44 x 165; assembly shop, 44 x 105; pattern shop, 50 x 105; gas producer plant, 70 x 45; machine shop, 285 x 75; another machine shop, 225 x 90.

—

To Make Manning Carbureters

JANESVILLE, WIS., March 18—The Manning Carburetor Co., organized some time ago at Janesville, Wis., by Elmer J. Manning, Ft. Atkinson, Wis., and H. B. Warne, Janesville, has completed experimental work on a carbureting device designed and patented by Manning. The company is ready to engage in regular production. The carburetor will be marketed under the style Manning.

—

Government Gets 1500 More Packards

DETROIT, March 16—The Packard Motor Car Co. has just delivered 1500 more trucks to the United States Government, making a total of 3500. The remainder will be delivered as fast as they can be produced.

—

Electric Plant for Topp-Stewart

CLINTONVILLE, WIS., March 16—The Topp-Stewart Tractor Co., which recently completed and placed in operation its new tractor plant in Clintonville, Wis., is constructing a large hydro-electric power plant on the Embarrass River, about twelve miles north of the city. It will furnish current for the operation of this and other Clintonville industries. The investment will be about $100,000.

—

Curtiss to Redeem 6 Per Cent Notes

BUFFALO, March 16—The Curtiss Aeroplane & Motor Corp. will redeem on March 29 all of its 6 per cent serial gold notes dated Jan. 1, 1917, at the price of 102½ per cent of the principal amount and accrued interest. Redemption will be made at the office of the Central Trust Co., 54 Wall Street, New York.

—

J. H. Faw Moves

NEW YORK, March 16—J. H. Faw, Inc., accessory manufacturer, is moving from 41 Warren Street to larger quarters at 37 Warren Street.

—

Addition for Buda Co.

HARVEY, ILL., March 19—The Buda Co. is erecting a 4-story addition for assembling and testing truck and tractor engines.

Signal Corps Needs Many Electrical Men

WASHINGTON, D. C., March 18—The Signal Corps, United States Army, has announced that it can use the services of a large number of men having electrical training. They are needed especially in connection with the radio communication systems in use in the military service.

All classes of electrical men—wiremen, expert electricians, storage battery men, telegraph and wireless operators, and men with electrical engineering training and experience are wanted. The opportunity offered is exceptional because of the great interest and importance of this branch of the service, which has been most aptly characterized as the nerve system of the army.

Application blanks for service in the radio work of the Signal Corps may be secured by addressing the Office of the Chief Signal Officer, Land Division, Training Section, Washington, D. C. Men of draft age may make application and if qualified will be inducted into the army, at their request, for service in this branch of the Signal Corps. After enlistment or induction, all personnel will be sent to one of several radio schools for six weeks to three months of intensive training in one of the three general branches of the radio work for which their previous experience qualifies them. Some of the personnel completing these courses will be commissioned, and the opportunity for advancement for all graduates will be dependent on the individual ability.

—

Brookings Heads Price-Fixing Committee

WASHINGTON, March 16—Robert S. Brookings, commissioner of finished products of the Council of National Defense, has been appointed chairman of the price-fixing committee of the council. He retains his position as commissioner of finished products, but this department will be operated temporarily by Charles M. Peak, appointed vice-commissioner, and who also has charge of the conversion of non-war industries.

—

Opposed to Smaller Salary for Aviators

WASHINGTON, March 18—The Senate Military Committee unanimously disapproved of the repeal of laws providing for extra allowances to aviators. The reduction was recommended by General Pershing and Secretary Baker. It was shown that reliable army hazards statistics were not available and British and French aviators told the committee of the conditions and danger of their work.

—

Restrict Bonus Law for Aviators

WASHINGTON, March 18—Secretary Daniels has announced that in the future Navy aviators will be required to make a certain number of actual flights before being entitled to the usual 50 per cent bonus.

—

$75,000 Appropriated for Standardization

WASHINGTON, March 16—The urgent deficiency appropriation bill, totaling over a billion dollars, passed by the Senate yesterday, contains, among others, the following appropriations:

For engineer department operation in the field, including purchase of material, construction of storehouses, purchase operation, maintenance and repair of horse-drawn and motor-propelled, passenger-carrying vehicles and for ordinary engineer depot expenses; $17,000,000.

To enable the Bureau of Standards to provide scientific assistance necessary in the development of instruments, devices, materials and standardization and testing of supplies for the War and Navy departments; $250,000.

To enable the Bureau of Standards to cooperate with the War and Navy departments and the Council of National Defense for the standardization and testing of standard gages, screw threads and standards required in manufacturing in U. S. and to calibrate and test these; $75,000.

Licenses Now Required for All Enemy Trading

WASHINGTON, March 16—The War Trade Board has determined that branches of corporations and other American concerns established in neutral territory or in territorial countries associated with the United States in the war shall obtain an enemy trade license from the War Trade Board before performing contracts which involve trading with an enemy or ally of enemy. As announced in January the War Trade Board has authorized such American concerns in foreign countries to perform all legal obligations enforcible in the courts of the country where such branches are established, notwithstanding that such performance should involve trading with an enemy or ally of enemies. This authorization, however, has been rescinded and all such branches must hereafter obtain a special enemy trade license as outlined above. Two exceptions to this are (1) that foreign branches of American houses are licensed to deal in enemy commercial paper when refusal may result in failure to collect a debt or may be a violation of local law, and (2) that branches of American banks are authorized to receive enemy paper for collection under such circumstances.

—

300 Per Cent Increase in Oil Price

WASHINGTON, March 18—Statistics of the oil industry gathered here show sharp advances in the price of crude oil in the last 3 years. Since 1915 the price of Pennsylvania grade oil, which is typical, has increased from $1.35 to $4, a gain of 300 per cent. In 1915 United States crude oil production was 11,000,000,000 gallons, and in 1917 13,250,000,000. Most of this increase was used for domestic purposes, the amount exported being almost stationary for the last 3 years. Practically all of the gasoline exported is for the war needs of the allied nations.

Calendar

ASSOCIATIONS

April 15-19—Little Rock, Ark., United States Good Roads Assn. Sixth Annual Session.

June 5-12—Hot Springs, Va., National Assn. Automobile & Accessory Jobbers.

June 17-19—Dayton, O., Society Automotive Engineers, Annual Midsummer Session.

SHOWS

Mar. 19-23—Vancouver, B. C., Western Canada Automobile Show Assn., Horse Show Bldg. D. A. Hamilton, Mgr.

Mar. 20-22—Houlton, Me., Second Annual, Houlton, Motor Car Dealers' Assn., Bangor St. Exhibition Hall. J. D. Luther, Mgr.

Mar. 20-23 — Holdredge, Neb., Second Annual of Southwest Nebraska.

Mar. 20-23—Greensboro, N. C. First Annual. John Kelly, Mgr.

Mar. 20-23 — Trenton, N. J., Trenton Auto Trade Assn., Second Regiment Armory. John L. Brock, Mgr.

Mar. 25-30—Rochester, N. Y., Tenth Annual. Rochester Auto. Trades Assn., Exposition Park. C. A. Simmons, Mgr.

Mar. 25-30 — Bridgeport, Conn., Fourth Regiment Conn. Home Guard State Armory and Casino. B. B. Steiber, Mgr.

Mar. 27-29—Fort Fairfield, Me., Reed's Garage. R. F. Reed, Mgr.

Mar. 30-April 6—Hartford, Conn., Eleventh Annual, Hartford Automobile Dealers' Assn., Inc. State Armory. B. F. Smith, Mgr.

Mar. 30-Apr. 6 — Atlantic City, N. J., Second Annual. Garden Pier. S. W. Megill, Mgr.

Mar. 30-Apr. 6—Chicago, Ill. Second Annual Chicago Used Show. Chicago Auto. Trade Assn. Coliseum.

Apr. 1-6—York, Pa., York Auto Dealers' Assn. T. F. Feiffer, Mgr.

April 3-6—Ogdensburg, N. Y. Second Annual, State Armory.

Apr. 6-8 — Green Bay, Wis., Brown County Automobile Trade Assn.

Apr. 6-13 — Red Bank, N. J., Monmouth County Auto. Dealers' Assn., Armory, E. C. Von Kattengell, Mgr.

Apr. 8-13—Reading, Pa., Reading Automobile Trade Assn.

Apr. 9-13—Stockton, Cal., Third Annual San Joaquin Auto Trade Assn. Samuel S. Cohn, Mgr.

Apr. 16-20—Deadwood, S. D. City Auditorium.

Apr. 17-19—Davis, Cal., Tractor Demonstration. University of California.

Apr. 17-20—Calumet, Mich., Upper Peninsular Show, Copper County Automobile Dealers & Garage Owners' Assn., Coliseum.

May 3-7 — Lima, Ohio. Ohio State Automobile Asn.

Sept. 23-28 — Chicago, National Accessory Show for Fords, Coliseum.

ENGINEERING

June 19-22 — Berlin, N. H. American Institute of Chemical Engineers.

June 26-28 — Buffalo, N. Y. American Society of Heating and Ventilating Engineers.

Sept. 2—Cripple Creek, Colo. American Institute of Mining Engineers.